ERIC P. NEWMAN NUMISMATIC EDUCATION SOCIETY

6450 Cecil Avenue, St. Louis, Missouri 63105

Craig B. Sholley
109 W. Big Spring Ave
Newville, PA 17241

June 16, 1997

Dear Craig:

Our telephone conversation was very interesting, all stimulated by Jon Warshovsky's comments in Numismatic News.

At your request I am sending a copy of the draft of your mint machinery article which I have interlineated. It was sent to me by Mark Borchardt at my request. You indicated it may contain changes which you are not yet aware of. Certainly the queries added in the footnotes must be new and require your response as well as footnote renumbering, etc. I hope I will not cause problems by sending this to you at this time. You have produced a gem.

You were going to send me any machinery pictures which you plan to use. There is no need to send any which are in Diderot, Cooper, Ansell or Taxay. Did Doty add anything new in pictures ?

The mint machinery illustrations I have uncovered I believe are printed in America, more detailed than others in most respects, accompanied by explanations and much clearer. They are of the Royal Mint and so far as I know are numismatically unknown. I had planned to use them in a separate publication as I told you but because of the quality of your work and the need for better illustrations than used in the Breen half cent book, I am thinking about what to do. I will study whatever you send me.

Sincerely,

EPN

Eric P. Newman

ERIC P. NEWMAN NUMISMATIC EDUCATION SOCIETY

6450 Cecil Avenue, St. Louis, Missouri 63105

June 26, 1997

Mr. Craig B. Sholley
109 W. Big Spring Avenue
Newville, PA 17241

Dear Craig:

The mysteries of the first U.S. Mint coin presses are many. Naturally, there is disagreement because we do not have enough facts. Exchange of ideas is essential, but more research needs to be done. That is why I am sending you photocopies of illustrations of the machinery in the Royal Mint which seem to be clearer and somewhat more detailed than those previously published in numismatic sources. They are furnished for your personal study only, and no part of these views or copies thereof or information derived from them is to be disclosed or sent to anyone or published without our written consent. We look forward to your opinion as to what they show which is different from other known data. We have not sent you the text describing the illustrations, but have held it in reserve. We ordinarily share information gladly, but the time and effort put into obtaining these views and data was immense, and we intended to publish them on our own. I now have an open mind on the matter.

You stated that you look for square edged early cents and they stand on end. Does this mean decorated or lettered edges as well as plain edges? Could a sharp planchet-cutter produce a perfect edge on the first batch? Could the edge have been rolled smooth by either the Castaing machine or an edge milling machine?

I also find that the idea of a simple planchet feeder was long known but didn't work too well. It had two sliding tongues, one over the other in a track. The top tongue had a hole in it to catch a blank from a hopper. Both were pushed forward together. The lower tongue went forward enough to knock off the struck piece and then hit a stop. The upper tongue went far enough to drop the blank on the die before it hit a stop. Then, both were withdrawn before the striking occurred. This is apparently described in 1731 in Machines Approuvées par L'acadamie, Vol 5, p. 155 which I have never seen. Do you know about this?

The date of the production by the new machinery at the Royal Mint is 1811 according to one account and 1812 in another. The machine designs were probably earlier as Boulton produced the 1797 English 1d and 2d coinage then and improvements for the Royal Mint were only natural.

Mr. Craig B. Sholley
Page 2 of 2
June 26, 1997

The drawings enclosed are for a screw coining press in which it seems that the upper die and lower die are both in horizontal rotation during striking. They are locked together for that period by a tooth and the upper die rises from the struck coin somewhat before the upper and lower die holders disengage. I had always thought the upper die was in a square cross sectioned slide path and the lower die firmly fixed to the base. What do you know about this?

I look forward to receiving the items you were going to send me; the fun is just beginning.

Sincerely,

Eric

Eric P. Newman

mb

Enclosures

Craig Sholley
109 W. Big Spring Ave.
Newville, PA 17241
July 13, 1997

Eric Newman
6450 Cecil Ave.
St. Louis, MO 63105

Dear Eric:

Thanks for the drawings of the Royal Mint equipment. The drawing of the manually-powered screw press is as expected from other illustrations I've seen and period presses which I've seen (esp. the one in the Smithsonian).

The large drawings are of Boulton's steam-powered screw coining press. I've seen drawings of these previously in Cooper, et. al.; Cooper's illustrations being the best. I don't believe the dies are rotating during striking - on this drawing the item annotated as ***b*** is the lower end of the screw, the assembly of items annotated as ***d***, ***e***, ***h***, and ***g*** shown in the exploded view marked Fig. 5 appears to be some kind of torque/wear plate. This assembly is mounted between the screw and the upper die; item ***f*** is apparently a shaft to which the upper die stake is bolted.

This assembly is analogous to the large square slide on manually powered screw presses, the purpose of this being to eliminate the torque of the screw and provide an axially stable slide for the upper die. Boulton's design is far cleaner, more compact, and allows greater adjustment, as expected from someone like him.

As to the square edges on LCs, the earliest piece I have in my collection is an 1819 N2 which shows a flat edge for about 2/3 of its circumference and has vertical striae indicative of ejection from a collar. I had a 16N2, but sold it. I have several other later dates.

I haven't seriously looked at the lettered-edge pieces, nor have I purchased any of the Draped Bust I've seen - to make any meaningful observations they coins have to be high VF35 or better and at this point they're simply too expensive. I'll look at while I'm at the ANA this year, but the best way to proceed would be to get in touch with well-heeled collectors and look at their pieces.

Best Regards,

Craig

ERIC P. NEWMAN NUMISMATIC EDUCATION SOCIETY

6450 Cecil Avenue, St. Louis, Missouri 63105

July 23, 1997

Mr. Craig Sholley
109 W. Big Spring Avenue
Newville, PA 17241

Dear Craig:

Thank you for your July 13, 1997 comments, which were very stimulating and helpful.

I hope your Numismatic Theatre presentation will be well received. Unfortunately, I will not be able to come to the Convention.

After I return from a trip to Africa, I will go farther into this machinery problem with you.

Would you be nice enough to send me a photocopy of any photo or information as to what Smithsonian has? Are there drawings of the press?

I have checked more of my material, and I want to talk to you about it. The engravings I sent you were prepared before 1815. The text which goes with them describes a circular motion of the upper die.

I also have a set of engravings dated 1818 drawn by a different artist. This also has a text mentioning that the upper die is raised vertically until it clears the top of the struck coin and then rotates with the screw. This text differs from the text accompanying the drawings I sent you. Could these descriptions be wrong?

I also feel that Cooper might have had his artist copy some of these drawings I have.

Incidentally, I am sure you noticed the cushioning mechanism and the clashing prevention mechanism in the drawings I sent you. This was new to me.

My best,

Eric

Eric P. Newman

mb

July 1997 (?)

Craig & Bonnie Sholley
109 W. Big Spring Ave.
Newville PA 17241

ERIC:

GOOD TALKING TO YOU. SORRY FOR THE HAND-WRITTEN LETTER; MY PRINTER DIED & WANTED TO GET THIS OUT ASAP.

ENCLOSED IS THE PHOTO OF THE PAINTING OF THE TOWER MINT PRESSROOM. YOU WERE CORRECT ABOUT THE PRE-1812 DATE: COOPER (PG 58) STATES THAT THIS IS AN ILLUSTRATION FROM ACKERMAN'S "MICROCOSM" PUBL. 1812 AND SHOWS THE PRESSROOM IN 1809.

I HAVE ALSO ENCLOSED A COUPLE OF THE ARTICLES I HAVE WRITTEN WHICH I THOUGHT YOU MIGHT FIND OF INTEREST. THE DIE STEEL ARTICLE APPEARED IN PENNY WISE & THE ONE ON DIES WAS A SPEECH AT LAST YEAR'S ANS COAC. I HAVE PHOTOS OF ALL OF THE DIES (INCLUDING THE 23 RESTRIKE) IF YOU WOULD LIKE COPIES.

I MUST DISAGREE W/ YOUR CONCLUSION THAT THE EARLY PRESSES ~~WERE~~ HAD FEEDFINGERS. I STILL AGREE W/ BOB JULIAN'S HYPOTHESIS THAT THEY WERE COPIED FROM HARPER CA. 1795 AS A RESULT OF THE "JEFFERSON HEAD" EXPERIMENT. I ALSO FEEL THAT THIS IS SUPPORTED BY BOUDINOT'S LETTER TO BOULTON.

REGARDING THE "OPEN COLLAR", THERE IS NO DOUBT THAT IT EXISTED. IN A LETTER FROM RM PATTERSON TO LEVI WOODBURY ON NOV. 8, 1836, PATERSON STATED:

> "THE OLD COIN WAS STRUCK IN WHAT WE TERM AN OPEN COLLAR, THIS IS STRUCK IN A CLOSE COLLAR . . . ."

THIS LETTER IS REPRODUCED IN TAXAY, PG 174.

HAVING ESTABLISHED THAT OPEN COLLARS DID EXIST — UNLESS ONE CARES TO PROPOSE THAT THIS LETTER IS BS — THE QUESTION IS NOW WHAT THEY WOULD HAVE LOOKED LIKE.

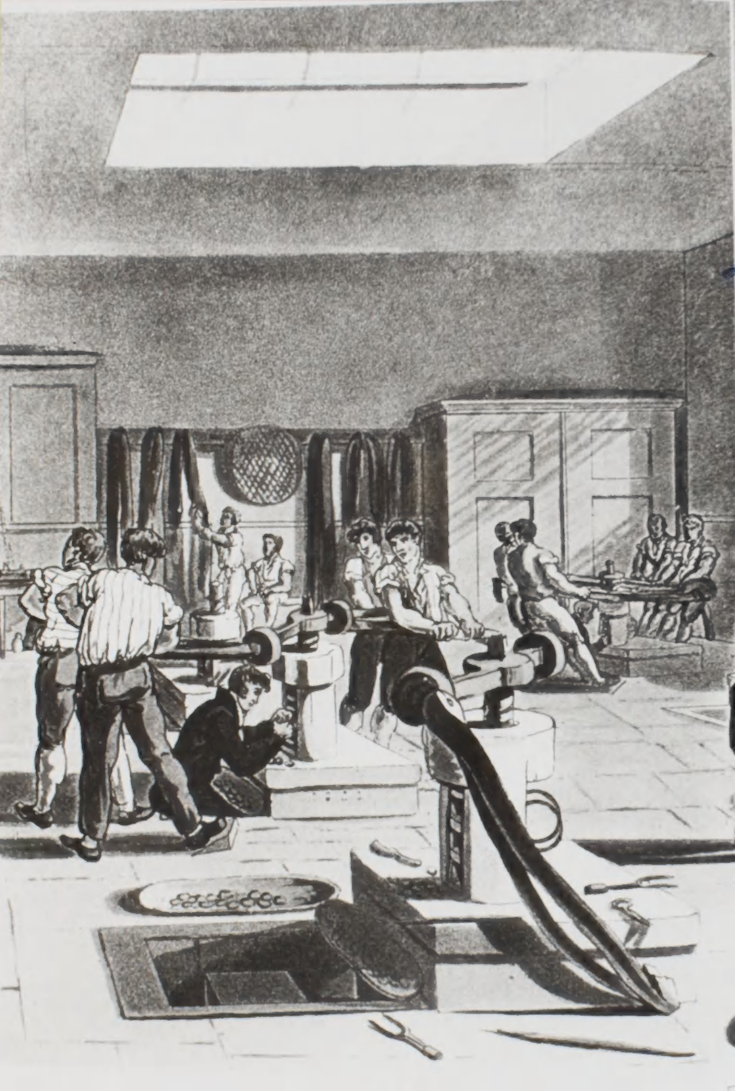
IT IS RELATIVELY EASY TO PICTURE AT LEAST ONE POSSIBLE SCENARIO. IF THE COLLAR WAS, SAY, .025 - .030" IN DIA LARGER THAN THE DIE, THIS WOULD PRODUCE VERY ACCURATE CENTERING AND PREVENT ANY SIGNIFICANT CONTACT W/ THE COLLAR. (BTW, I BELIEVE THE COLLARS WERE "TIGHTENED" SOMETIME DURING THE CLASSIC HEADS OR IMMEDIATELY AFTER 1816, THUS ACCOUNTING FOR THE FLATTENED EDGES SEEN ON MANY MIDDLE DATES. THIS DOES NOT APPLY TO THE BUST HALFS - IF YOU'VE SEEN THE 1806 HALF DIE IN THE ANS YOU'LL UNDERSTAND; IF NOT THEN LET ME KNOW & I'LL WRITE.)

SORRY YOU WON'T BE AT THE ANA THIS YEAR, WOULD LIKE TO HAVE MET W/ YOU. LET ME KNOW WHEN YOU'LL BE "OUT EAST" & I'LL SEE IF WE CAN GET TOGETHER.

THANKS AGAIN FOR THE "HEADS-UP" ON THE CHAPTER I WROTE FOR THE CENT BOOK - I'LL GIVE BORCKHART A CALL & SOME HEAT OVER THIS.

BEST REGARDS
Craig B. Sholley

PS DO YOU HAVE EMAIL? IF SO MINE IS CRAIGS109@AOL.COM



Ackermon's
"Microcosim" & published 1812

from an 1809 scene

this was the old style
press before the changeover
to Boulton machinery.

See: Cooper, p. 58

Washington
WASHINGTON · UNIVERSITY · IN · ST · LOUIS

Department of Chemistry

July 30, 1997

Mr. Eric P. Newman
6450 Cecil Ave.
Clayton, MO 63105

Dear Eric,

I have a bad conscience about not having sent along the comments on Craig Sholley's "How the Early Cents Were Made Chapter" which I now enclose. I was preparing for a two week absence in Europe and the page of comments just got lost on my desk.

I was in Heidelberg at a meeting commemorating the hundredth anniversary of the birth of a man with whom I worked just after I finished my PhD at Yale lo these many years ago. He was a great chemist and ultimately won a Nobel prize. I wish I could say that my work helped him toward that distinction, but that was definitely not the case. It was nice to see some old friends with whom I worked in the lab in 1961 and 1962, but they are mostly near the end of their scientific careers, while I feel that I am just beginning.

I stopped in Paris for a few days and met a couple of vigorous young French numismatists. It sounds like a fresh new breeze is blowing through French numismatic circles, and it is about time! I'm still trying to learn where Eloye Mestrelle learned about mechanical coining before he came to the Tower of London at the beginning of the reign of Elizabeth I. I have some names of French historians and a mint archivist who may be able to help.

One last numismatic item. I just acquired price lists 28 to 34 (missing one in between) issued by your old friend B. G. Johnson of the St. Louis Coin Co. about the time he moved from 11th Street to Olive - it must have been in the 20's or early 30's but no dates. You may have these, but if you don't I'd like to give them to you.

All the best!

Sincerely yours,

Peter Gaspar
Professor of Chemistry

Washington University
Campus Box 1134
One Brookings Drive
St. Louis, Missouri 63130-4899
(314) 935-6530

Comments by Peter Gaspar on "How The Early Cents Were Made" by Craig B. Sholley

1. This is an excellent, well-written paper. Since Sholley's interpretations of the documentary evidence are often original, it is very important for him to record what he actually read. My impression is that he has read many original mint documents, but as he generally refers to them via secondary references such as Taxay and Stewart, it is difficult to tell which documents Sholley examined personally and which he takes on faith from other writers. I think that in the case of each original document that Sholley has read he should cite it by a specific archival reference so that a reader, if he or she wished, could find it for themselves. Giving an additional reference to a secondary source is helpful, but not as important.

2. There is a slightly confused reference to a "London firm" of "Governor and Company of Copper Miners". Surely the Company of Copper Miners is a guild with a Governor.

3. The term "Castaing machine" is an unfortunate modern invention. The machine introduced in 1685 in the Paris mint by Castaing was an adaptation of Blondeau's parallel bar edge-marking machine, probably invented in Paris by Blondeau before he came to England but certainly first used for circulation coinage in London in 1662.

4. The problems associated with hardening a die are described brilliantly. For an illustration of a slightly later apparatus for spraying water on a die from a reservoir, see G. F. Ansell, The Royal Mint, 3rd edition, 1871, p. 78. It should perhaps be mentioned that dies hardened by the process described by Mr. Sholley are so hard that their brittleness places them in danger of cracking upon use. The final step in the hardening operation was the tempering step in which the hardened die was heated to below its annealing temperature to soften it a bit and hence toughen it. It was critical to judge how hot the hardened die had to be heated, and for how long, to toughen it sufficiently without softening it too much. This was usually done by using the color of the hot steel as a criterion, a "straw" color being often mentioned. Faulty tempering would have led to as many die failures as any other error in the die sinking/finishing sequence.

Craig Sholley
109 W. Big Spring Ave.
Newville, PA 17241
Sept. 2, 1997

Eric Newman
6450 Cecil Ave.
St. Louis, MO 63105

Dear Eric:

Please excuse my delay in replying; things sometimes get hectic around here. Hope you enjoyed Africa.

I met an old friend of yours at the ANA - Dick Johnson. I'll be helping him with his book on minting technology. Your info would be a great addition to his work.

I'm also helping Noyes with his new book on the middle date Large Cents: minting & die sinking info, misc. notes from the Archives, errors, etc.

Regarding the rotation of the upper die, this is still quite confusing. Not sure what Boulton had in mind here. Perhaps if you sent the text that goes with it I may be able to figure it out. Boulton was a damn good mechanic, so there had to be a reason.

I don't see the anti-clash and cushioning mechanisms you mentioned in your last letter (7/23/97). I do see that Boulton was ejecting by lowering the collar.

I looked at several lettered-edge LCs at the ANA; can't really draw a conclusion. I spoke with the guys at the Gallery Mint and they **are not** using a collar. They control the size of the coin both by the size (thickness & dia.) of the planchet and by "feeling" the right strike. They do produce some small percentage of broadstrikes tho', more on the copper than the silver pieces. At this time they feeding the planchets by hand, it will be interesting to see what happens when they try feed-finger w/o a collar.

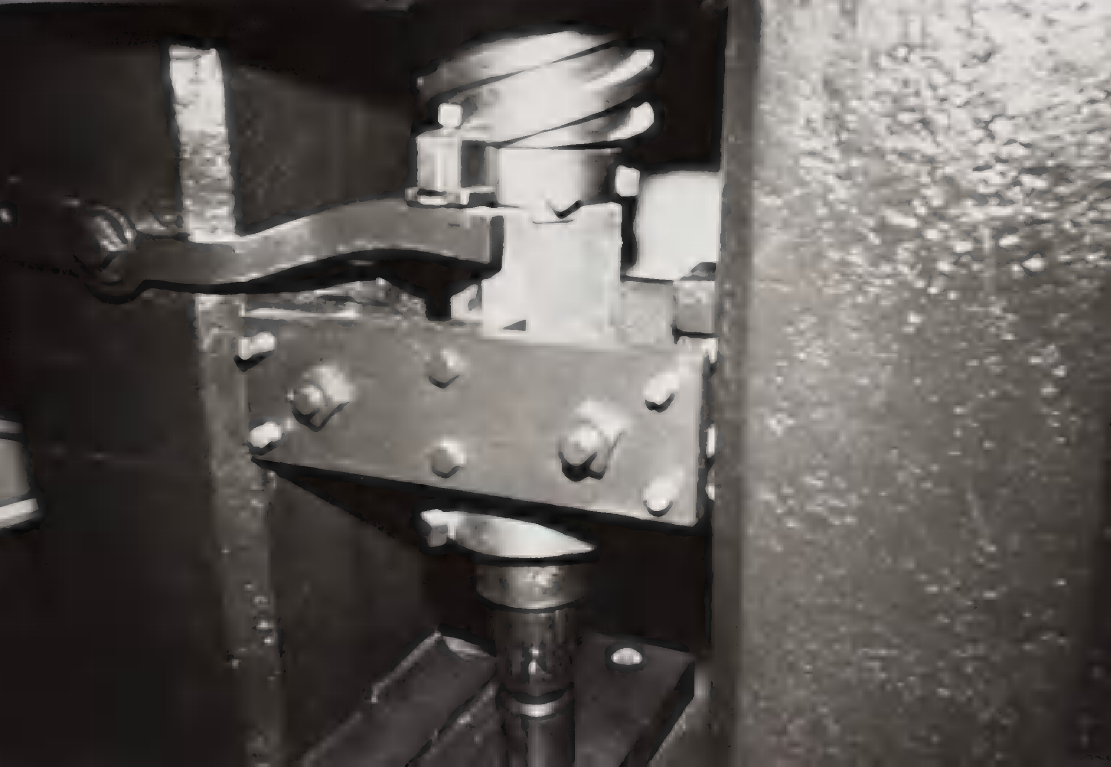
While at the ANA I had the opportunity to examine a couple off-center middle dates. These pieces showed some thinning and tapering of the unstruck portion indicating to me that there was a collar by this time. Also, Noyes mentioned that the is a specimen striking of a 1795 plain edge in the ANS which exhibits very flat edges. Based on his description, I would tentatively conclude that collars were in use by this time; I need to see this piece sometime to confirm. As I'll be doing the error section for the Noyes book, I will have the opportunity to see many more pieces - this should help in confirming or denying my current hypothesis of the collar.

I've enclosed some photos of the press in the Smithsonian. The pictures aren't too good, but they show the basic layout and some detail. I'm emailing Doty to see if they have any drawings. I'll make it down there sometime to get another look at this.

Look forward to hearing from you soon - how about getting a computer & we can email!

Best Regards,

Craig



Smithsonian Institute

from S Colley

1997

Craig Sholley
109 W. Big Spring Ave.
Newville, PA 17241
Oct. 8, 1997

Eric Newman
6450 Cecil Ave.
St. Louis, MO 63105

Dear Eric:

I have been thinking about your request that I take the lead on the Boulton minting machinery research. I am sad to say that I will have to decline for health reasons.

Unfortunately I have a bad heart and have just had a fourth heart-attack this weekend. While the last three have been relatively mild attacks, I'm now averaging one attack every two years. At this rate it won't be too long before I'm on the wrong side of the odds. Although the doctors assure me otherwise (these being the same doctors who assured me that a low-fat diet, exercise, & medication would prevent further attacks), I have no real expectation of living much longer. As such, I do want to devote the time I have left to finishing a few articles and projects I have had in the works.

With this in mind, perhaps the best route is to find someone else to do the digging and I will certainly help with interpretation. I would really suggest Dick Johnson since this area is really in line with his broad scope research anyway.

I hope I haven't depressed you with this health stuff. And if I have well, look on the bright side - it will prove my long standing conviction that doctors are the same as lawyers; the only difference being whereas lawyers merely rob you, doctors will rob you and kill you too!

Best Regards,

Craig

ERIC P. NEWMAN NUMISMATIC EDUCATION SOCIETY

6450 Cecil Avenue, St. Louis, Missouri 63105

November 3, 1997

Craig Sholley
109 W. Big Spring Ave
Newville, PA 17241

Dear Craig:

I was truly shaken up by your pessimism as to your health, but you have not lost your sense of humor. Your view of lawyers (I am one) is mostly correct. Your view of doctors needs to be modified as they just might be able to help by chance. Let them rob you if they help you physically.

Please send to Dick Johnson copies of what I sent you if you wish.

Even though you want to drop the lead in the major mint machinery project I have some exciting mews. I am informed that there must have been a planchet feeder when the Fugios were struck because all known of two varieties are off center in exactly the same position. Isn't that fascinating.

Therefore I sat down and tried to figure out how a simple planchet feeder could work in the US in 1787 and not injure the operator. I enclose my sketch and my explanatory notes. It is crude and out of proportion and poorly drawn.

Would you revise it and draw a decent sketch. I think it would help get your mind off yourself and be part of a cure. I really think something like this happened. No fingers were lost. Double strikes would occur. Some off centers would take place. A few dies would clash. A few brockages would happen. It would support a uniform off center if set slightly improperly.

Incidentally did you read in the material I sent you that the upper die rotated during striking. Somebody believed it, but I don't as yet.

Good luck,

Eric P. Newman

BOWERS AND MERENA
GALLERIES, INC.
Your friends in the rare coin business

June 9, 1997

Mr. Eric Newman
6450 Cecil Ave.
St. Louis, MO 63105

Dear Mr. Newman:

It was very nice speaking with you Wednesday regarding the Numismatic News article covering Breen's Large Cent Encyclopedia. I have enclosed with this letter a copy of the chapter entitled "How the Early Cents Were Made" which Craig B. Sholley wrote. The various questions that you had are all answered in this chapter.

When we spoke, I was involved with several varied projects and was not thinking clearly regarding this chapter. The article by Kneass is included in its entirety in this chapter. Also, the comments regarding planchets being hand fed through 1799 are included here along with the original source for this material.

I am truly excited about the possibilities of using the drawings in your possession regarding the early Mint machinery. Should you decide that the Large Cent book is the proper forum to publish these, I would be most grateful to receive the same.

Thank you very much for contacting me regarding these matters.

Best personal regards,

Mark Borckardt
Senior Numismatist

MB/mk

Enclosure: as noted

Craig B. Sholley
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ERIC P. NEWMAN NUMISMATIC EDUCATION SOCIETY

6450 Cecil Avenue, St. Louis, Missouri 63105

Craig Sholley
109 W. Big Spring Ave
Newville, PA 17241

September 29, 1997

Dear Craig:

While I was in Colonial Williamsburg for a numismatic lecture and event I checked their encyclopaedia holdings. I enclose the article on Coinage from Vol. 5 published in 1798 at Philadelphia with plate CXLIV to which it refers. The description of the 18 volume encyclopaedia is also enclosed. Obviously the article was written in England and was introduced in America without any American input. It adds nothing new unfortunately.

This still leaves the 1802 Britannica printed in London open for checking.

I hope you can continue to check for similar articles I suggested and which may throw more light or more accurate light on the subject.

I look forward to hearing from you.

Sincerely,

Eric P. Newman

J.D.R.C., Inc.
John Dannreuther Rare Coins, Inc.

August 26-27, 1998

Dear Eric:

How true! It is a shame that we have not become numismatic friends before now. However, until I was made Director of Research for PCGS two years ago, I was a full-time coin dealer and grader. This newly found freedom allowed me the time to write the grading book (I am glad you have found it interesting. I must point out that David Hall is the one who called me a "W.C.N.G." If you know David, you probably know that he occasionally uses hyperbole.) I tried to make it a book that could be enjoyed by novice collectors, advanced collectors, investors, and serious numismatists such as yourself.

I was disappointed that my name was not on the cover, but the covers were printed in advance and Random House thought it would sell better with the well-known names of Dave Bowers and Scott Travers in a prominent position. The first printing of 20,000 has nearly sold out and a second printing of 10,000 is in the works. Maybe I should see if the covers have already been printed for the second printing? (My next work will have my name on the cover – that work is in progress and will be published sometime next year. I will certainly have hard-cover copies made for my second book. I did ask for 500-1000 hardbound grading books but was turned down.)

I cannot, however, take credit for the three chapters about counterfeits. I wrote 11 of the 14 chapters of the grading book but Rick Montgomery wrote the 3 chapters on counterfeits. Bruce Amspacher rewrote these 3 chapters and I edited them and made some changes, so I did have something to do with them. I do like your suggestion of differentiating between counterfeits and forgeries. A second edition with hundreds of additional photos is being discussed and if that comes to fruition, I will incorporate that change in the counterfeit section. I think the word forgeries better describes those coins meant to deceive whereas counterfeit should refer to just contemporary counterfeits.

Now, to attempt to answer your questions – although in no particular order. First I will address the term open collar about which you inquired and which I consider to be a misnomer. All collars are closed collars – even the Peter Droz segmented collar is a closed collar, just in multiple pieces. (Breen attributes the term collar die to you for the close or closed collar. As usual, this is very astute as the close or closed collar is actually a third die.) Breen and others have used the term open collar to refer to the positioning collar used prior to the introduction of the close collar (collar die) in 1836 at the Mint. (Of course, foreign mints used collar dies prior to 1836.) Breen states that "Earlier issues had been struck in an open collar, which positioned the blanks on the rev. die but did not confine them, as this would have flattened edge reeding or lettering." (Breen *Encyclopedia p. 305*). I recall reading (I think it was in the *John Reich Journal*) that there was perhaps an eighth of an inch around the planchet before it was struck. Since the planchet would have been work hardened after lettering or reeding had been imparted by the Castaing machine, it would expand upon striking but not touch the restraining or open collar or, as Breen noted, the edges would have been crushed. The restrike crushed lettered edge Proof half dollars of 1833-35 are but one example of what happens to lettering in a close collar or collar die! (A plain collar die in this case.) Again, technically speaking, these early strikings did not have collar dies but probably had what should best be called a positioning or restraining collar. I don't know where the term open collar originated, but I have heard it for years, Breen and others used it, so I "went with the flow." Perhaps I should have called it a positioning or restraining collar to prevent confusion. Just as stellas have been collected for years as part of the regular gold series (they are obviously patterns), some traditions are fairly well entrenched – so I used the term open collar. However, I agree with you. It is a poor term, in fact an oxymoron. Perhaps I will write an article for the PCGS quarterly-issued *Market Report* clarifying this issue. As usual, your comments are very astute! I did notice that under the definition of close(d) collar in the Glossary of the grading book, it is noted that "open and close collars are both closed collars…" Still, it is a confusing term.

To Peter Gaspar Dec 2, 1998
From Eric Newman

To eleminate any question as to whether the use of the word "close" collar meant close or closed in U.S. Minting practices the attached references are important:

9/22/1836 letter from Robert Patterson, Director of US Mint to Adam Eckfeldt, Chief Coiner of US Mint

11/8/1836 letter from Robert Patterson, Director of US Mint to Levi Woodbury, Secy of US Treas.

From these references it can be concluded that close means exactly what it says:

1) a ground collar is a smooth collar for a plain edged coin
2) Both the reeded and smooth collar dies surround and are close to the coin die faces
3) The word close describes a distance not a shape
4) The opposite of "close" is distant, the opposite of closed is open.
5. A meaning of closed for a collar die would have been redundant and pointless as no collar die would work if it was open.
6. The word open was used long before collar dies were introduced with steam coinage at the U.S. Mint and had nothing to do with edge formation.

Craig Sholley
109 W. Big Spring Ave.
Newville, PA 17241
Jan. 20, 1999

Eric Newman
6450 Cecil Ave.
St. Louis, MO 63105

Dear Eric:

Sorry for the delay in getting this off to you, but it took me longer than I figured to pull all the data together in a coherent form. Also, other less important matters such as work interfered a bit!

Anyway, enclosed is the Boudinot/Boulton letter of April 22, 1799 mentioning the feeding of planchets. I have highlighted this passage. I have also attached measurements of some of my Early and Middle Date cents. These indicate a collar that varied from around .025 to .050 larger than the die (using 1.095 as the nominal diameter of the dies).

I'm afraid I'll have to strongly disagree re your hypotheses on the open collar not being a complete circle, the "wiper" on the upper die, and that Wailes' description of the feeding mechanism was inaccurate. The evidence on the struck coins, the physics of metal flow, and a careful mechanical design analysis do not support your conclusions.

First, regarding your feeling that the term "open" is not the opposite of "close" in a mechanical sense, I'll have to disagree. When I was a Process/Quality Engineer in the metal working industry, we (the Mech. Engineers, PEs, and QEs) often used these terms in exactly that sense. We would often refer to increasing a dimension or tolerance as "opening" it. Similarly, we often referred to too tight a fit as "too close", and very tight tolerance machining work (such as in aircraft bearings) was referred to a "close tolerance work".

This terminology is not unique to a single plant or industry, I used these same terms in the five different plants in which I worked: a primary metals producer; a deep-drawing, stamping, and forming plant; an aircraft bearing plant; and in the mechanical design/machining areas of two different electronics plants,

Additionally, I note that one of the definitions for open in Webster's Dictionary is "expanded, spread out", whereas close is defined as "fitting tightly or exactly". Therefore, from the perspectives of both engineering jargon and that of standard English, the use of open to mean a loose fit and close for a tight fit is completely consistent.

Secondly, the physical features of struck cents in combination with metal flow dynamics also provide considerable support for the view of the open collar as a complete circle.

A planchet that is upset has its rim work hardened to some degree and this work hardening will affect the metal flow producing specific effects on the rim as a result of striking. If the flow is unrestrained by mechanical means (i.e., contact with a collar), the metal at the rim which is work hardened the least will flow first.

For example, if the center of the rim is work hardened the least, it will flow first resulting in an edge that has a convex shape. Conversely, if the center is hardened more than the edges, the upper and lower edges will flow first yielding a rim that is concave. If the rim is hardened such that one edge is softer than both the center and the other edge, that edge flow first yielding a tapered edge. These tapered edges are also usually slightly concave or convex, depending upon whether the other rim or the center was harder.

Additionally, the edges resulting from unrestrained flow do not have a smooth surface profile; they are quite wavy with many lumps, bumps, ridges and valleys. This is caused both by nicks in the planchet edge from the manufacturing and cleaning processes, and by minute variations in metal flow. The nicks are "scattered" and randomly oriented with respect to the edge, whereas the ridges and valleys caused by metal flow are in the direction of the flow and are therefore horizontally oriented.

All of the aforementioned types of edges are seen on large cents, sometimes in combination on the same coin. This is due to variations in the "hardness profile" - as the planchet was upset, variations in the diameter of the planchet, the metal properties, and the upsetting die(s) caused variations in hardness about the circumference.

What will never be seen in unrestrained flow is a completely flat edge, and this too is seen on the large cents. These flat edges show conclusive evidence of being formed by compression of the planchet against the collar. The edge is straight and smooth generally for its complete height (from rim to rim). There are very few nicks, and many of these voids show "healing" from compression (i.e., same as nicks on the planchet faces which are "closed" by striking). These edges also sometimes show faint vertical striations and ridges. As I'll explain shortly, these vertical striae are definitely caused by contact with the collar.

At this point, I am sure you will be tempted to ask: What if the center and edges are both hardened equally? While this is certainly a neat "philosophical" argument, this is physical science not philosophy, and this can't happen. The internal grain structure (crystal lattice), grain size, and the mechanical properties of the individual grains and their boundaries are so variable that this is an impossibility. Some portion will always give first.

At this point I should mention that the upset large cent planchets I have seen show a smooth, fairly flat surface (except, of course, for the "handling" nicks) usually with a rounding at the rims. This is a minor point as the physics of metal flow render this point entirely moot, but I mention it for accuracy.

Since a perfectly flat edge with the aforementioned features cannot be explained by the principles of metal flow without restriction and such edges are seen on large cents, there must be a mechanism for that restriction. This mechanism is contact with the collar.

So, what's the proof? Well, I have been aware for sometime that certain varieties always show vertical striations on their edges due to contact with the collar. These cannot be a result of the upsetting operation since these striae always occur at the same location on the circumference relative to the lettering. To illustrate this, I'll use the case of certain 1819 varieties - my data is best developed for these since I first discovered it on these varieties.

Well-struck 1819 N2s, N8s, and N9s show a flat, smooth edge for a considerable portion of their circumference. The two N2s, the N8 and the N9 I own show this flat edge for about 180°, 240°, and 260°, respectively. Along this flat edge are the striations I mentioned. On the N2s, there are two "sets" of these striae, one above the first A and one above the R in AMERICA. On the N8 and N9, I have counted 22 striae starting at the last S in STATES and continuing clockwise to below the center of the ribbon in the wreath.

The N8 and N9 also show something very interesting that I discovered when reviewing the data in preparation for this letter. I noticed that the location and pattern of the striae were very similar for both these varieties. I then placed these coins side-by-side, and the striae matched perfectly - their shapes and relative locations are exactly the same for these two varieties! Ergo, N8 and N9 were struck using the same collar. I also note that the striae on N2 are somewhat similar, and this may be and earlier state of the same collar. This sequence does fit the emission sequence of 1-2-10-9-8 proposed by John Wright.

The striae also match up in terms of location and shape to the dentils and the spaces between the dentils. "Wide" striae match to an entire dentil, whereas "narrow" striae match to the edge of a dentil or the space between a dentil. Also, there are often "doublet" and "triplet" sets of narrow striae that match to the edges of two adjacent dentils, and the space between for the triplet sets. This is solid evidence that the collar chaffing against the dies forms the striae. When the dentils are punched, metal will flow out to the periphery of the die leaving sharp edges and burrs. Also the shape of the die's circumference at the dentils will be serrated. These burrs and the serration account for the striations cause by the chaffing.

As to the shape of the collar, it was clearly a complete circle as shown by the fact that various varieties show flat edges along any given portion of the circumference and that they also show this flattening for more than 180° and up to 360°.

For example, the two N2s are flat from the D in UNITED clockwise through the I in AMERICA. The N8 and N9 are flat from between the last S in STATES and the O in OF clockwise through the D in UNITED. Also, an 1817 N6 I own is flat from the right wreath stem clockwise through the last S in STATES. And my 1818 N10 (as are many I have seen) is flat from between OF clockwise through the E in UNITED.

With the diameter of the two N2s being 1.109" - 1.113" and 1.110" - 1.112", and the "minor diameters" of 1.109 and 1.110 corresponding to the areas on these coins that do not show a completely flat edge, the diameter of the collar would seem to be around 1.113. However, this is probably a bit misleading. Since the N2s really only show flattening for about 180°, this is not, in my mind, an accurate indication of the collar diameter. Additionally, the striae on this variety (as with that of N8 and 9) show that chaffing only occurred on a small portion of the circumference, thus the collar was axially off-center to the die.

A better view of the collar diameter can be deduced from the N8 and N9 which show flattening for much more of the circumference thus yielding more reliable results. The diameters of the N8 and N9 are 1.115 to 1.116 and 1.113 to 1.117, respectively (again the minor diameters correspond to that portion of the coins which do not show the flat edge). Thus, the collar was around was around 1.117. Likewise, the diameter of the collar for the 1818 N10 is 1.113 to 1.115, yielding a collar diameter of around 1.115.

Data for other varieties yields different collar diameters. My 1826 N5, which shows a flat edge from the I in AMERICA clockwise through the first S in STATES, has a diameter of 1.123 to 1.127. An 1828 N6 which shows flattening of the center of the edge for its entire circumference has a diameter of 1.120 - 1.122. Likewise, my 1829 N2 which has basically a completely flat edge for its entire circumference has a diameter of 1.122 - 1.224. And coins that do not evidence any flattening of the edge are in the range of 1.127 to 1.135. These include my 1816 N9, 1825 N6, 1827 N6 and N11, etc.

These measurements show the collar was what some would consider to be quite variable in size with the range being around 1.115 to 1.135. However, looking at this range in engineering terms yields a diameter of 1.125 ± .010. To anyone who has done machining or mechanical engineering design, the tolerance of "plus or minus ten-thousandths" is quite common. This tolerance is quite typical for "non-critical" dimensions. Since the Mint, having eliminated the edge devices in 1795, was obviously not terribly concerned with the edge on cents, this tolerance is quite compatible with the collar diameter as a non-critical dimension.

At this point I do need to mention that the reason is use the word "around" in referring to the dimensions presented is that there is some uncertainty in these numbers for technical reasons. First, it is almost a certainty that when the diameter of a coin is measured, that diameter **is not** the actual diameter of the collar. Mechanical play in the fixtures, axial misalignment, and expansion of both the planchet and the collar from both the compressional forces and heating from frictional forces during striking all induce variation. Additionally, my dial calipers have not been calibrated to NBS standards and I use pieces of "scotch tape" on the measuring surfaces to preclude scratching of the coins. These sources of error could easily cause errors of plus or minus one or two-thousandths in measurement.

Before going on to the feeding mechanism, I'll address one last item about the collar. The foregoing conclusively shows that the collar was both a complete circle and that it was surrounding the dies forming a striking chamber during striking. This brings up an important point about the articulation of the collar. Since it would be impossible to eject a coin while the collar was in place, either the die was raised or the collar was depressed during striking.

As to the design and articulation of the feed fingers, I have to strongly disagree with you and basically accept B. C. Wailes' description. This is an eyewitness account and answers all of the design criteria for a feeding mechanism: the mechanism must place a planchet under the dies while simultaneously extracting the struck coin and conveying that coin to a chute leading out of the press. Excepting for his misstatement about the fingers causing the reeded edge, his account is completely compatible with other historical records and can therefore be viewed as quite accurate despite this minor, but understandable, misinterpretation.

After carefully reading Wailes' description several times, his account implies that the feed fingers remained extended over the dies during striking. After striking and on the return stroke, the fingers closed, recapturing the struck coin and dropping it into a chute prior to picking up the next planchet. This motion appears to be similar to the feed mechanism on the Boulton presses - see pg. 135 in Cooper. This would mean that the collar was in place during feeding and that the die was raised to eject the coin.

Other articulations are possible. As Cooper points out in his book, on several of the European presses the collar was depressed and the fingers merely pushed the struck coin out of the way as the planchet was being feed. (I know that your objection to ejection in this manner is that the coin slides on the die. However, this was clearly done in the past and it is still done today - the rotary feed tables slide the planchet over the die and then off the die down a chute into a bin. Big deal; they're striking coins for circulation not for numismatists to examine under high-power microscopes. Who cares if the coins have slide marks? Besides this is no worse that the damage done by sliding down a chute into a bin only to be bagged or kegged with thousands of other coins and shipped half way around the darn country.)

It is therefore possible that this is either poor wording or another misinterpretation of the mechanism by Wailes. However, the actual articulation of the fingers is of little importance in my mind - this is merely "variations on a theme". What is important in this account is that there is a description of a feed mechanism as a horizontal set of fingers, in the shape of nippers, feeding a planchet from a tube and extracting the struck coin as the press is actuated.

As to the necessity of a "wiper" to remove the coin from the upper die, with all due respect, this is absolute nonsense. Your rationale for this seems to be that the folks at the Gallery Mint are having this problem, but this in no way proves or even offers the slightest evidence that the Mint had the same problem.

The Mint doesn't have this problem today, or as far back as the introduction of the new steam presses (engineering drawings of these exist). Likewise, there is no drawing of a wiper in other historical records, so no one else had this problem either.

I frequently saw this problem in industry and it was always caused by improper die design, improper clearances, the metal being dirty and greasy, or all three. So, if you tell me that GMM has a problem, then I say that's **their** problem and they need to start with their die design by checking the basining and the rake on the features; then they need to make sure that the planchets are very clean and free of grease.

The wiper also poses a serious mechanical problem. By knocking a coin off the upper die in this manner, it could land anywhere - back on the die, under the die and collar, anywhere. This is a very serious problem. Yes, you can then propose all sorts of plates, chutes and other mechanical mess to take care of this and then eject the coin. But then you don't have a design; you have a "Rube Goldberg" contraption.

As I learned in industry, the first rule of mechanical design is KISS: Keep It Simple, Stupid. If you find that your design is creating problems and forces additional and ever more complex mechanisms to take care of those inherent deficiencies, then the problem is the base design.

To sum this up, I think that the foregoing supports two conclusions: 1) The "open" collar was a completely circular hole in a plate, and 2) The feed fingers were as described by Wailes. In the first case, the data supports this conclusion; in the second case, we have a historical record that has much support from other historical records, **and** no conflicting records.

This is not to say that this cannot disproved and another design proposed. However, this would require refutation of the above and substantiation of the proposed design. To refute the current data, the edges will have to be shown to not be formed by compression and the Wailes account will have to be disputed by another historical record. The proposed alternative design would then have to be supported by historical records. If it can't be shown that someone used a similar design, the hypothesis is totally unsupportable.

Well, those are my thoughts. Guess that's it for now.

Best Regards,

Craig

DATE	COIN DIA.	EDGE OF DIE VISIBLE(1)	ROC(2)	DIE DIA.(3)	FLAT EDGE(4)	CIRC. FLAT(5)
1797 S139	1.137 - 1.152(6)	REVERSE	.545 - .548	1.090 - 1.096	NO	-
1800 S191	1.116 - 1.127	NO	-	-	NO	-
1805 S267	1.123 - 1.129	NO	-	-	NO	-
1816 N1	1.128 - 1.132	NO	-	-	YES	240
1816 N9	1.122 - 1.128	YES	548 - .550	1.096 - 1.100	NO	-
1817 N16	1.116 - 1.127	YES	.545 - .548	1.090 - 1.095	YES	180
1818 N10	1.113 - 1.115	NO	-	-	YES	360
1819 N2	1.109 - 1.113	NO	-	-	YES	180
1819 N2	1.110 - 1.112	NO	-	-	YES	180
1819 N8	1.115 -1.117	NO	-	-	YES	240
1819 N9	1.113 - 1.116	NO	-	-	YES	260
1825 N6	1.123 - 1.127	NO	-	-	NO	-
1826 N5	1.123 - 1.127	NO	-	-	YES	220
1827 N6	1.133 - 1.135	OBVERSE	.545 - .548	1.090 - 1.096	NO	-
1827 N11	1.131 - 1.134	OBVERSE	.548 - .550	1.096 - 1.100	NO	-
1829 N2	1.122 - 1.124	OBVERSE	.548 - .550	1.096 - 1.100	YES	360

Notes:

1. From coins with axially misaligned dies; dies are off-center, producing an outline of the edge of the die on one face.
2. Radius of curvature of the die edge on the coins with misaligned dies. Measured with a radius gage.
3. Estimated diameter of the die based on 2 x ROC.
4. Coin shows flattening of edge.
5. Degrees of circumference which show flat edge.
6. May be caused by off-center collar, mis-made collar, or earliest collar were larger. Needs more study.

I want to think more about you ~~great~~ fine letter of 1/20/99. The Wailes' comments are ~~in the~~ in the late 1820s and I am talking about ~~[illegible]~~ 1797-1802. Your important flat edge data begins in 1816. In the interim knowledge of Boulton's improvement spread all over the world.

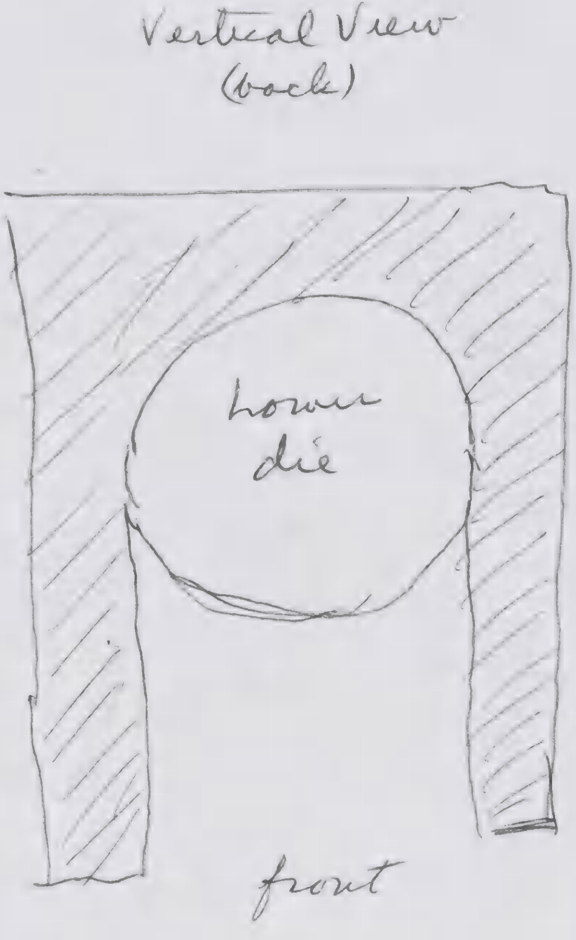
The 1799 letter is much appreciated. It ~~mainly~~ says the press is fed from a hopper, but nothing about the removal of the struck coin.
~~I wonder what you think removed the struck~~
I presume you think the struck coin was removed by tongs and not knocked off by the front of the planchet ~~[illegible]~~ slider

I fully understand there can be various meanings to "open" but what was the item? It does not seem the Breen has it right. A tongs would not be described as an open collar.

4/6/99

Peter:

I am expecting you to figure out exactly how the open collar must have worked, assuming it was associated with a cylindrical die-neck. Here is a variation ~~as~~ a new possibility.



The collar rises enough to stop a blank in a proper position when it is pushed forward out of the feeder tube onto the slider. The open collar would be depressed below the level of the top of the lower die when the upper die was coming down so it would not interfere with striking or expansion during striking.

The front of the slider would have a brush or spring to push the struck coin off the lower die. then the open collar rises to receive new blank.

The collar would not raise the struck coin off the lower die as previously outlined. as it would block the ejection often if the feeder was pushing forward.

This would eliminate a finger feeder and merely slide a blank into the proper position into an "open collar" which would then retract. This could be hand operated or operated by elements on the screw press or part of each.

Can a horizontal brush or spring push a struck coin off a die to the back without damage to the struck coin.

May 11, 1999 ①

To: Ron Landes
From: Eric P. Newman

Further thinking on planchet feeding and coin ejection problems continues as I explained to you in our recent telephone conversation. I need your steady input to guide me.

With (1) the 1795 Boudinot report to the House of Representatives, (2) the 1812(?) Sellers report on his experience at the U.S. Mint and (3) the Wailes notations of 1829 it is certain that planchets were fed into the screw press automatically for striking and then ejected automatically after striking during the entire period of operation of the first U.S. Mint. Perhaps there may have been minor changes.

My new interpretation of the Wailes notations changes the word "rivit" to "pivot" and the unreadable word to "scissel" (He used the word nipper which definitely means a tongs). The tongs would have to have a semi-circular cut out on the inside of each arm to grasp and move the planchet forward. This apparently is the "open collar" which officials mention, since it acts as a collar and it opens during operation.

I have concluded that if the tongs slide the planchet forward onto the top of the lower die, the arms must open before striking because (even if they are thinner than the planchet) the ~~spread~~ expansion in diameter due to striking could easily open the arms in a crosswise direction but it cannot ~~spread~~ expand in the longitudinal direction of the arms because the struck coin would jam into the arms of the tongs and damage them or damage the coin.

Not Sent

②

the serious problem is how ejection worked. The struck coin dropped out of a shute according to the verbal descriptions. First it must be determined whether the struck coin is brought out backwards toward the planchet tube or forward away from the planchet tube. To come out backwards it would have to fall into an opening in the slide path. The tongs would have opened somewhat but not fully so it would drag the coin backward off the lower die so as to drop in a hole in the slide path. This hole could cause difficulty in the forward movement of the tongs which would be pinching the planchet and sliding it along the top surface of the slide. Another problem is that the struck coin may not be caught by the tongs arms because it bounced out of the lower die or stuck to the upper die. Pulling the struck coin off the lower die might damage the coin.

Wrong idea

To be pushed or flicked out of the lower die in a forward motion is ~~the~~ only practical option. The tongs would open substantially at the end of their forward movement and leave the struck coin in place after the striking and when the tongs withdrew. Since the neck of the dies were machined to the same size as the dieface there must be a reason as I previously pointed out. A neck plate around the lower die could be held just above the level of the lower die face by a spring or springs whenever the tongs were not in a forward position. The tongs holder could have fingers in front which would depress the neck plate whenever in forward position and could permit the neckplate to rise when the tongs retracted. The neck plate would fit snugly around the lower die and lift the struck coin off the lower die after the tongs had retracted. The struck coin would remain loose there until the next forward movement of the tongs which would sweep or push back the struck coin into the shute about the same time as it was depressing the neck plate. The ~~coin would be loose and~~ part of the neck plate raising the coin could be sloped to push it in the proper forward direction, but this is not essential.

If the coin bounced out of the lower die after striking the sweeping motion would push the coin backward. If the coin stuck to the upper die it would be flicked off by a separate fixed horizontal element which extended up to the neck of the upper die

By using the expression tongs holder I mean the element containing the stop which prevents further forward motion of the tongs and onto which the tongs is attached.

These brilliant U.S. Mint mechanics left us with a first class mystery. The coins show no damage from the ejection. The ejector surfaces could be oiled. They could be made of ~~soft~~ hard or soft material including leather or bristles as well as metal or wood. There are no metallic dust particles ~~[illegible]~~ or flakes mashed into any copper, silver or gold coins.

I think the solution of the problem is near. Please comment as promptly as you can. I cannot turn my mind off this problem.

P.S. Please let me know the relationship of the ~~size~~ diameter of the planchet and the die. Is the planchet the exact size of the die or slightly less? Is the struck coin slightly greater in diameter than the die? I assume that the diameter of the planchet increases 3% to 5% on striking.

ERIC P. NEWMAN NUMISMATIC EDUCATION SOCIETY

6450 Cecil Avenue, St. Louis, Missouri 63105

Craig Sholley
109 W. Big Spring Ave
Newville, PA 17241

May 18, 1999

Dear Craig:

I have read over your January 20, 1999 letter to me concerning the feeding and ejecting mechanisms at the early U.S. Mint. for more times than you can believe. I sincerely appreciate its extensive and considered input. I wanted to respond sooner but was unfortunately side tracked by needed work on the ANS cent theft matter and additional squabbles of others.

You have emphasized the Wailes data in your letter and I have studied his comments further. He was a Mississippi cotton planter on a sight seeing vacation to the East coast and wrote a remarkable description in a pocket notebook of his morning visit to the U.S. Mint with his wife. I have a couple of amendments to suggest for his text. The undecipherable word is scissel, scrap or salvage. The word "rivit" is probably "pivot".

Your explanation for the collar constraining the planchet during striking is very convincing and conforms to the Boulton equipment, but I wonder whether that applies to other than coppers. The silver and gold coinage has lettered or reeded edges which would be harmed (reeded particularly) by the restraint of a collar. The collar would also be unnecessary. Wailes mentions that the planchets are weighed and this could only apply to silver and gold. Wailes making the error about edge designs being put on by a squeezing of the nippers is understandable, but he might have assumed that what happened in copper striking also happened in specie coin striking. I would like your opinion as to whether the mechanism for feeding and ejection would work without a collar for specie as I believe it should when a Castaing machine was first used on the edges of the planchets.

I am now satisfied that the nippers could push the struck coin forward into the chute without much harm, but why were necks of the dies for specie coinage not beveled if no collar was used ? Is it possible that a collar plate for a specie coin would rise by spring action after striking to raise the expanded struck coin off the die to avoid any ejection marring. Your fine work on neck measurements leads me to such conclusions. It could be only a partial collar. A similar type of attachment to that you describe could be used except that activation would occur after the striking instead of before the striking. Both would depress before the next planchet would be set in place by the nippers. A partial collar to help ejection could give rise to the open collar expression.

The definition of open collar in the glossary of Breen has to be wrong as he says it is a thin plate with a hole in it larger than the planchet. It cannot accurately be used for positioning the planchet over the lower die as he states.

I also would like to know if the diameter of the planchet is as near to the die face diameter as possible or whether the planchet was slightly smaller.

I sincerely hope that your health has stabilized and that you can continue to help me and others in our understanding of striking mechanics. I cannot sleep soundly because I cannot turn my mind off of numismatic problems like this. Please cure my insomnia by your answer.

With kind regards,

Eric P. Newman

ERIC P. NEWMAN NUMISMATIC EDUCATION SOCIETY

6450 Cecil Avenue, St. Louis, Missouri 63105

Robert W. Julian
1003 Riverside Dr.
Logansport, IN 46947

May 26, 1999

Dear Bob:

Pursuant to our pleasant telephone conversation today concerning the feeding and ejection mechanisms at the early U.S. Mint I enclose a copy of my recent letter to Craig Sholley. I also enclose an engraving of this part of the machinery as published in Philadelphia in 1818 but actually dated 1815 and obviously derived from English sources and not American. This engraving is in much greater detail than I have ever encountered and I would like to be the first to republish it. I have only sent it to Ron Landis and Craig Sholley in restricted form for help in figuring out my problems. Will you please keep it for your personal enlightenment and help for me.

I have so many alternatives as to:

1) what an open collar is,
2) to justify the necks being cylindrical instead of beveled,
3) for die rising or collar rising or being depressed,
4) for variations in shape of the top of the collar,
5) for shape and movement of the nippers,
6) for ejection of a coin when sitting on a die or being raised above the die, etc.

This is an absolutely fascinating puzzle, with clues few and far between. These mechanical geniuses at the U.S. Mint were amazing.

My best,

Eric P. Newman

[redacted]

Mercantile
Money Museum

Mercantile Tower
Seventh & Washington
St. Louis, Mo. 63101
314-421-1819

Robert W. Julian
1003 Riverside Dr.
Logansport, IN 46947

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I have so many alternatives as (1) to what an open collar is, (2) to justify the necks being cylindrical instead of beveled, (3) for die rising or collar rising or being depressed, (4) for variations in shape of the top of the collar, (5) for shape and movement of the nippers, (6) for ejection of a coin when sitting on a die or being raised above the die, etc.

This is an absolutely fascinating puzzle, with clues few and far between. These mechanical geniuses at the U.S. Mint were amazing.

My best,

Eric P. Newman

6/19/1999

To Eric /
Thanks for the ideas
and discussion. I simply
wouldn't have thought of
doing this w/o you bringing
the subject up.
Best, Craig

The Third Die:
Part I - Middle and Late Date Cents

Craig Sholley

Early last January Eric Newman called to discuss the collars (I always look forward to Eric's calls, he asks tough questions). While I had some very basic idea of what the collars looked like both from my background in the stamping industry and a brief study of certain features on the coins, our discussion made it quite apparent that additional study was needed.

I told Eric that I'd look into the subject further and get back with him. I figured this would be a quick project, as I really hadn't expected to find much. Well, it's now been 5 months and the study is still expanding!

Breen stated that the close collar was first introduced on half cents in 1831 and on cents in 1834.[1] There's just one problem - there's literally no historical documentation supporting this! Breen took a very brief mention in the Mint records of the change from "open" collars to "close", reeded collars for certain silver denominations and extended this to the early copper coinage. But, the copper coinage is not mentioned at all, and there is no description of what an "open" collar was!

So, what's the real story? Were Middle Dates struck in an open or close collar? And what did the collars look like on both the Middle and Late Dates? While the Mint records reveal nothing, the physical features of the edges of cents in combination with physics of metal flow provide conclusive evidence of certain design features of the collar used on these issues. And there is some non-Mint historical documentation that provides additional information.

Most Middle Date and all Late Date cents show a flat, smooth, slightly tapered edge showing no convexity or concavity. This edge generally extends the full height of the coin (rim to rim) with a slight rolling at the rim. These features provide very strong evidence that the edge was formed by compression of the planchet against the collar.

First, blank planchets do not have a flat edge; they have a slightly convex edge. Secondly, the planchet expands a good bit during striking. Measurements of blank planchets and finished coins show an expansion of about .030". This expansion (metal flow) will not produce a flat edge. The edge would be either concave or convex depending upon how the edge of the planchet was work-hardened during upsetting.[2]

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[1] See Breen's half cent encyclopedia, pp. 320, 378, 476 - 7, 480. Other authors have placed this as late as 1838.

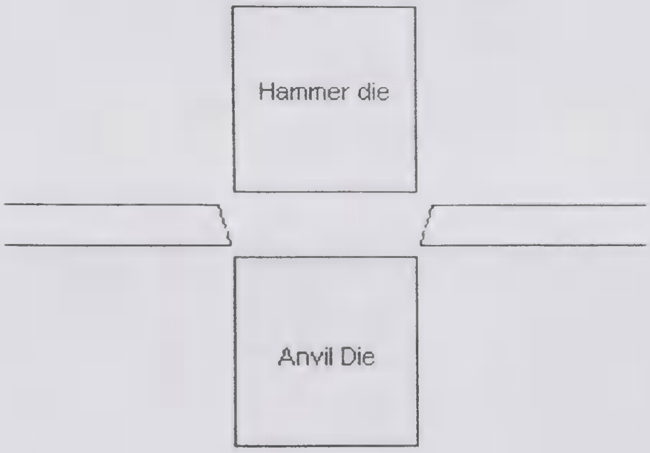
[2] Concave and convex edges are seen on the "uncompressed" portion of the edges on Middle Dates, with convex being predominant and the convexity being significantly greater than that on blank planchets.

On the Middle Dates, the flat edge is often seen for only part of the circumference of the coin, generally around 200^0 to 270^0 with the rest of the edge being convex, although many do have a flat edge for the full 360^0. Late Dates, however, are generally flat for the full 360^0.

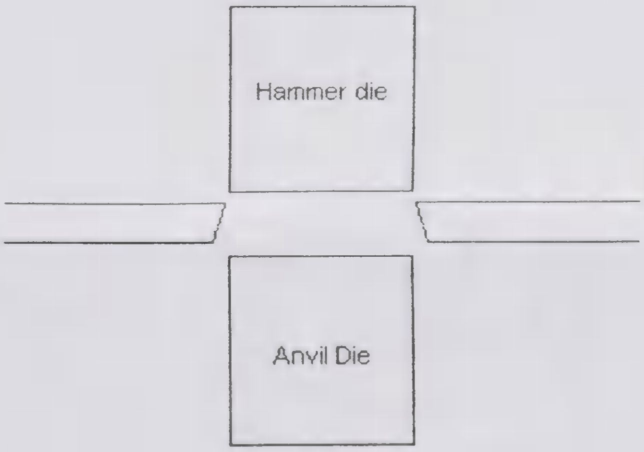
For those Middle Date varieties which do not show a full 360^0 flat edge, it is worth noting that the portion of the edge which is flat changes from year to year, varieties within a year, and even on different coins of the same variety. For example, the edge on 16N2 is generally flat for the entire circumference whereas 17N6 is only flat for about 270^0. Also, one 19N2 may be flat from the E in UNITED clockwise through the I in AMERICA and another may be slightly different, being flat from N in UNITED through M in AMERICA, and so on. This is due to both the collars being slightly different and the planchet landing a bit differently in the striking chamber from strike to strike. However, if one looks at enough coins of a date or variety, virtually the entire circumference of that date or variety will be found with a flat edge.

Two key features of this flat edge - the fact that the entire circumference is involved and the taper - provide definitive evidence as to what the aperture (the hole) of the collar looked like. First, since the flat edge is seen on the entire circumference, the collar was obviously a complete circle. And secondly, since there is a taper, the aperture was tapered. This tapering is quite important.

Putting a taper into a die that "captures" and forms a piece of metal is a design requirement. If the collar were machined with a "straight" aperture, the compression of the struck coin against the collar would solidly jam the coin in the collar and it could not be ejected. To prevent this problem the aperture is deliberately machined with a taper. The taper must always be towards the anvil die or the coin cannot be ejected as can be seen from the following diagrams: [3]



Taper towards anvil die - will eject easily



Taper towards hammer die - cannot eject

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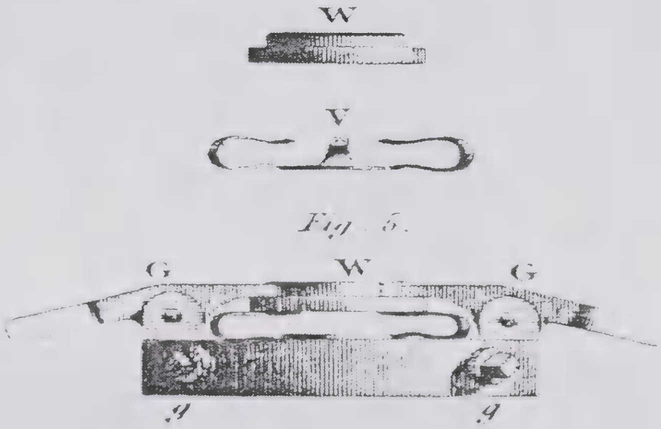
[3] The diagrams are intended to illustrate the taper of the aperture and do not show the actual cross-section of a collar. An actual collar would have been around half an inch thick and would have extended down over the lower die for a good portion of this height. perhaps 5/16ths of an inch or so.

So, by simply looking at the edge we can easily tell which die, obverse or reverse, was the hammer and which was the anvil. For the 62 varieties of both Middle and Late Dates I have examined so far, all but one shows that the obverse was the hammer die as the edge is tapered towards the reverse. The sole exception is 25N6, on this variety the reverse was the hammer die as the taper is towards the obverse.[4]

From measurements of coins, the aperture for Middle Dates from 1816 through 1837 was approximately 1.110" to 1.125" with a taper of about .003" to .006". In 1838 the collar was tightened slightly and from then on the aperture typically measures around 1.085" to 1.100". The taper for these issues typically runs .002" to .004".[5] This tightening of the aperture in 1838 corresponds to a slight reduction in the die diameter. These design changes may have been due to Gobrecht trying to improve the strike on the cents.

While the features on the coins reveal quite a bit about the aperture of the collar, they obviously cannot provide any information on what the rest of the collar and its associated mechanisms looked like. Fortunately, there is some historical documentation that provides the answers. Since the mechanism changed with the introduction of the steam press in 1836, I'll discuss the screw press first.

In the American Edition of the New Edinburg Encyclopedia published in 1815 in Philadelphia, there are drawings of Boulton's steam powered coining press and the associated tooling. One of the drawings is that of the collar and its mechanism as shown below:[6]



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[4] The 1823 "Restrike" dies show that both the obverse and reverse die for the large cents were exactly the same size. See Craig Sholley, "Early U.S. Coining Dies in the ANS Collection" from *America's Large Cent*, Proceedings of the Coinage of the Americas Conference, November 1996, John Kleeberg, editor.

[5] The diameter was measured near the reverse. Since the collar extended over both dies, the measurements only apply to the "striking chamber area" of the collar. These measurements also are approximate, as a struck coin will tend to expand slightly as it is ejected, so the actual aperture diameter is probably a bit smaller. From the measurements it is the author's estimate that the entire aperture was machined such that it was only about .005" larger that the die at the lower side and tapered to about .020 larger than the die at the upper side.

[6] The drawing shown is actually from the 1818 Encyclopedia Britannica - the clarity is much better and it has an exploded view.

While some may feel it's a bit of a stretch to draw a parallel from Boulton's steam press to the Mint's manual screw presses, it should be noted that Boulton's press was really nothing more than a "beefed-up" screw press (complete with swing arm, etc.) that was powered by a steam engine. The tooling is therefore identical to that on a manually powered screw press. Also, not only was this mechanism obviously common knowledge by the early 1800s, but Boulton was also the Mint's supplier for copper planchets and had provided technical information in the past. And, after all, here is the collar in print, in Philadelphia, in 1815 - the year before the flat edges appear on the cents!

As can be noted from the drawing, the collar and its mechanisms are extremely simple - a good design practice. The collar is secured to a tri-lobed leaf spring that is set in a fixture with two levers used to depress the collar. This fixture bolts fast to the lower die cup using three bolts, two of which are shown.

The collar is depressed as the press is opened. This is accomplished by two rods which are fixed at one end to the levers (G) and at the other end to the upper die stake, or "slider" which is a large block of metal to which the upper die cup is bolted. The die stake also serves as a "bushing" for the screw to press against and eliminates the torque of the screw while transmitting the vertical strike.

When the screw descends, the rods are pushed down along with the upper die and the ends of the levers are likewise depressed allowing the spring to raise the collar in place to form the striking chamber. As the press is opened the process is reversed and the collar depressed allowing the feed fingers to sweep the struck coin off the die and into a chute while simultaneously dropping a planchet on the lower die.

The spring mount not only permitted the depressing of the collar for feeding, but also protected against misfed planchets. If a planchet were only slightly misfed, the rising collar would tend to slide the planchet back on to the die (the tapered aperture probably helped this). If the planchet were significantly misfed such that it remained on top of the collar or partially in the striking area, the spring mount would protect the dies (and collar) by depressing as the dies closed.

With the introduction of the steam press in 1836, the design of the collar itself probably did not change much, however the mechanism did. While there is no historical record of the mechanism, as I indicated in my article last month, the original press still exists. This press shows that the collar was still spring mounted to prevent damage, but instead of depressing the collar to permit feeding and ejection, the lower die was raised.

One other feature of the coins themselves provides us with a good bit of information on the collars. This is the vertical marks frequently seen on the edges of Middle Dates and occasionally on the Late Dates. These vertical marks, or striations, often run the entire height of the edge and have been reported by various authors in past issues of *P-W* where they were generally mistaken for faint reeding in the collar or evidence that a planchet had possibly been reeded prior to striking (see figure 1).[7] While some of the striations on some varieties do resemble reeding, they have characteristics that show that they definitely are not.

The best example of this I have found so far is on three varieties of 1819 - N2, N8, and N9. These three varieties share neither a common obverse nor reverse, and the current emission sequence is thought to be 2-9-8 with N10 coming between 2 and 9. While viewing the cents in my collection, I noticed that there were striations on the edges of N2, N8 and N9 looked very similar and looked like they occurred in the same position relative to the reverse letters and obverse stars. A photograph of the heaviest striations is shown in figure 2.

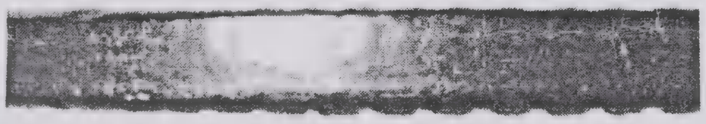

Fig. 1 - faint reeding-like edge marks on 16N2

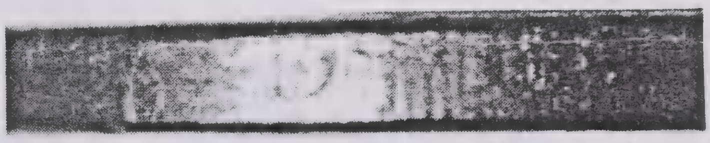

Fig. 2 - heavy edge marks on 19N8 and 19N9

I stacked the coins together using Mylar film as separators to prevent scratching, and not only did the striations match up, but there was also a definite progression to them. N2 shows few and fainter lines that N9 or 8. N9 and 8 show virtually the same lines with the ones on N8 being a bit stronger. In all I matched about 10 lines on N2 to N9 and 8, and stopped counting at about 122 matches between N9 and 8!

To confirm this, I started double-checking N2s, 8s and 9s at shows and consistently found the same lines. In April I met with Tom Reynolds and Bill Noyes at a show and showed them the lines on my coins. We then proceeded to match these with coins from Reynolds stock. Not surprisingly (to me, at least) there were the lines on Tom's coins.

So, what are these striations? Well, they're definitely collar related since they appear in the same position on different coins and different varieties. This rules out planchets reeded by the Castaing machine prior to striking. And they're not caused by reeding in the collar since many of the lines are far too broad and the wrong shape (see the following photographs).

The key point of the striations is that most of them, especially the broad heavy ones, line up perfectly with the dentils or the spaces between the dentils. Why is this important? The dentils are right at the edge of the die, so that a die actually is quite similar to a serrated knife. Now, a screw press is not a "high tolerance" machine, there's quite a bit of mechanical "play" in the mechanisms, so as the press was opened and closed and the collar depressed and released, the dies chaffed against the collar forming many of the striations.

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[7] See Herb Silberman, *Partially Reeded Edges of Some Large Cents*, Sept. 15, 1972, pg. 13; John Nicholas, *A Significant New Find - Another 1834 N7 Large Cent*, Nov. 15, 1980, pg. 240; George Ewing, Jr., *Edge Devices*, Sept 15, 1981, pg. 229; Robert Showalter, *The Plain Over Reeded Edge Half Cent*, Nov. 15, 1985, pg.303.

Chaffing by the dies does not cause all of the striations. On several varieties the striations are very fine, close together, and are seen for the complete 360^0 of the edge. They are particularly visible on 31N9 and 36N3 although many other Middle Dates also show them. These striations were caused by file or cutting lines in the collar. I call these collars "rough collars" for lack of a better term.

As most collars have a very smooth appearance, except for the chaffing marks, it would appear that the collars were ground or honed after machining and filing. The "rough collars" apparently were put into use with out going through this step.[8]

Not surprisingly, the later cents are a bit different. I have not seen any of the 1836 - 39 issues nor any Late Date with any evidence of chaffing. This is probably due to both the introduction of the "embattled rim" in 1836 and of the steam press early that same year. The embattled rim dies had a small step machined at the edge of the die to produce the rim and thus the dentils are no longer at the edge of the die, and the steam press had a mechanism with much less mechanical play that the screw press. These two factors may have eliminated the chaffing.

The Late Dates do, however, occasionally show a "rough collar" - the early state 51N5 in my collection shows these lines quite nicely, though they are not nearly as strong as those on the Middle Dates.

From the foregoing, a number of fairly solid conclusions can be drawn about the collar. First, the Middle Dates were obviously struck in a pretty tight collar. Do we wish to call this a "close" collar? Well, to make a bad pun, it's close enough for me! Secondly, from the features and measurements of the edges, the collar was machined and ground and it had a taper to facilitate ejection. Also, the collars changed diameter in 1838 or so as a result of Gobrecht's design revisions. And finally, the available historical documentation indicates that on the screw press the collar was depressed to permit feeding and ejection. On the steam press, a review of the press mechanism shows that this action was changed and the lower die was raised to eject the struck coin and receive the blank planchet.

My email is now back up, so anyone interested in sending data, asking a question, or just getting in touch can email me at: **craigs@pa.net**.

Acknowledgements

Thanks to Bill Noyes and Tom Reynolds for their contributions. Special thanks to Eric Newman whose questions that got this study going and for the copies of the encyclopedias cited herein.

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[8] The letter from Patterson to Eckfeldt of Sept. 22, 1836 concerning the striking of the Gobrecht Dollars does provide some support for this proposition. In this letter Patterson referred to striking the dollars in a "close reeded or **ground** collar" [emphasis by the author].

June 1999?

Washington
WASHINGTON · UNIVERSITY · IN · ST · LOUIS

Arts and Sciences

Department of Chemistry

Eric P. Newman
6450 Cecil Avenue
Clayton, MO 63105

Dear Eric,

I have had a bad conscience for weeks for not having written to thank you for the very interesting evening at the St. Louis Explorers Club meeting. Meeting many of the members and hearing the presentation of the project to promote the private development of space travel was most stimulating. The encouragement of private development of more efficient space vehicles makes a lot more sense to me than the space shuttle flights, particularly this week's nostalgia event.

Also please tell Evelyn that I have heard many people raving about the butterfly project. I am looking forward to taking Carole to see it one of these weekends. I've been swamped with my 350-student organic chemistry lecture course.

I've just been reading the proceedings of the 1996 COAC conference on the large cent. I wish I had been there, since there are several points I would have liked to raise with the paper presenters. I think John Kleeberg's theory of the strawberry leaf 1793 as a counterfeit for circulation depends entirely on how much work was put into the edge decoration. I was disappointed at his not presenting photographs of the edges, not even that of the ANS specimen. If it was a crude, quick job done in a minute or two with a file, then counterfeiters might have been able to make a profit; otherwise your view as quoted by Kleeberg must prevail. In any case the edge is crucial, and edge photographs should have been included. It is a pity that Kleeberg was his own editor, since his paper would have profited from considerable tightening.

I'd be interested in your views on the dies illustrated in Craig Sholley's paper. Figures 1, 2, 3, and 5 show dies with cylindrical necks just larger in diameter then the designs, yet the dates they carry are in the period prior to the use of a "close collar" if I have this term correct. I don't believe that such necks would have been used unless one were striking in a close collar, since sloping necks would have increased considerably the die life. Was there a "loose collar" and an ejection mechanism that required the use of dies with narrow cylindrical necks? Or are these all dies for restrikes made with a close collar?

I hope you are well. I know you are busy. I look forward to our next opportunity for good numismatic conversation. Your remarks about John Ford during our ride too and from Schneidhorsts were extremely interesting to me. All the best!

Peter

Campus Box 1134, Washington University, One Brookings Drive, Saint Louis, Missouri 63130-4899
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ERIC P. NEWMAN NUMISMATIC EDUCATION SOCIETY

6450 Cecil Avenue, St. Louis, Missouri 63105

August 5, 1999

Mr. Craig Sholley
189 W. Big Spring Avenue
Newville, PA 17241

Dear Craig:

Your article "The Third Die" was first and foremost in P-W of 7/15/99. I am sure you will receive "rave" comments about it. It has solved a major numismatic puzzlement.

I plan to ask at the EAC meeting in Chicago whether anyone has any thought as to the open collar, as that seems to have been continued in use for silver and gold after the close collar was introduced for copper coinage.

Please be kind enough to give me the plate number(s) of the 1818 edition of the Encyclopedia illustration you reproduced.

Congratulations on a fine accomplishment.

Sincerely,

Eric

Eric P. Newman

mb

8/23/99
FAX 212 234 3381

To Whomever is in Charge
of the Harry W. Fowler lecture

From Eric P Newman

Michel Amandry who will give the Fowler lecture may be able to do me a great favor and obtain or order for me a photocopy or other reproduction of the text and illustrations of two small items I need for a paper I am writing. I will gladly pay any expense. I hope it will be no inconvenience and I will be very grateful. He is at the Biblíoteque Nationale in Paris and they should also be there.

Machines Approuvée par L'Academie (1731)
Vol. 5, p. 155

Rapport fait a la classe, des Sciences Mathematiques et Physiques, de L'Institut National; sur diverse Inventions de Jean Pierre Droz, relatives a L'Art des Monnayage
(It is 18th century but I have no citation)

I will be very grateful.

3 AM 4/10/00
St Louis, Mo.

To: Mr. Craig Sholley:
From: Eric P. Newman

I was so pleased by your telephone call to me earlier tonight on your return from the EAC meeting. I tried to sleep but woke up after midnight with the solution (I hope) to the open collar feeding and ejecting problem for the reinvention of the U.S. Mint early coinage mechanisms. My adjusted theory eliminates the last worry I had concerning feeding and ejecting. It is so simple and if I am wrong I know you will challenge it. I lectured at the EAC in St Louis in 1992 on the feeder and ejecting mechanism and in looking back I said I was asking rather than telling how it was accomplished.

The vertically sliding open collar fitted onto the lower die stem or neck would have an opening of about 160 degrees instead of 180 degrees on the portion facing the feeder. This enables the collar to lift out the struck coin horizontally without tilting toward the feeder or otherwise, since the struck coin has expanded in diameter 3% to 5% due to the striking and the collar lifts the struck coin up off the lower die in order for the spring ejector on the feeder front to push it off into the shute.

With the collar segment more than 180 degrees it must not interfere with the slide feeder mechanism. To make room for the planchet thickness and for the planchet to slide forward two modifications have to be made. The slide path under the feeder arm is narrowed to somewhat less than the planchet diameter to make room for the end portions of the of the collar to move up and down. To make room for the planchet to be pushed onto the die without bumping into the end portions of the collar the ends of the collar are undercut so that when they rise their underside clears the vertical height of the planchet while the 180 degree part of the collar acts as a stop for the planchet being fed in.

When the upper die comes down the entire collar is depressed below the lower die level by fingers on the upper die holder so that when the upper die holder rises the collar springs back to a position above the lower die face level lifting the struck coin up off the lower die and putting the collar into a position to stop the planchet in a proper position for the next strike.

The feeder and collar motion can be automatically activated by the movement of the upper die holder. It can operate at the speed of the screw press as raised and lowered. No tongs are involved, only planchets being fed from a tube into a slider. If a struck coin sticks to the upper die after striking then fixed horizontal collar segments will flick it off.

This attempted reinvention is just that. It arises from the observations you made that the diameter of the neck of dies is machined to the same diameter as the lower die (or upper die since they are exchangeable) for a sufficient distance to indicate a collar was sliding up and down on the die neck. Ordinarily a die neck would be tapered for endurance.

Thank you for talking over this problem with me for years. Please make some drawings if you think my thoughts have merit.

I am sending a copy of this letter to my friend Peter Gaspar with whom I have been exchanging ideas on this mechanism for years. Also Ron & Joe for their help.

Now I can go back to sleep! It's 4:30 AM.

Thrive
Eric

Please excuse my writing this instead of typing.

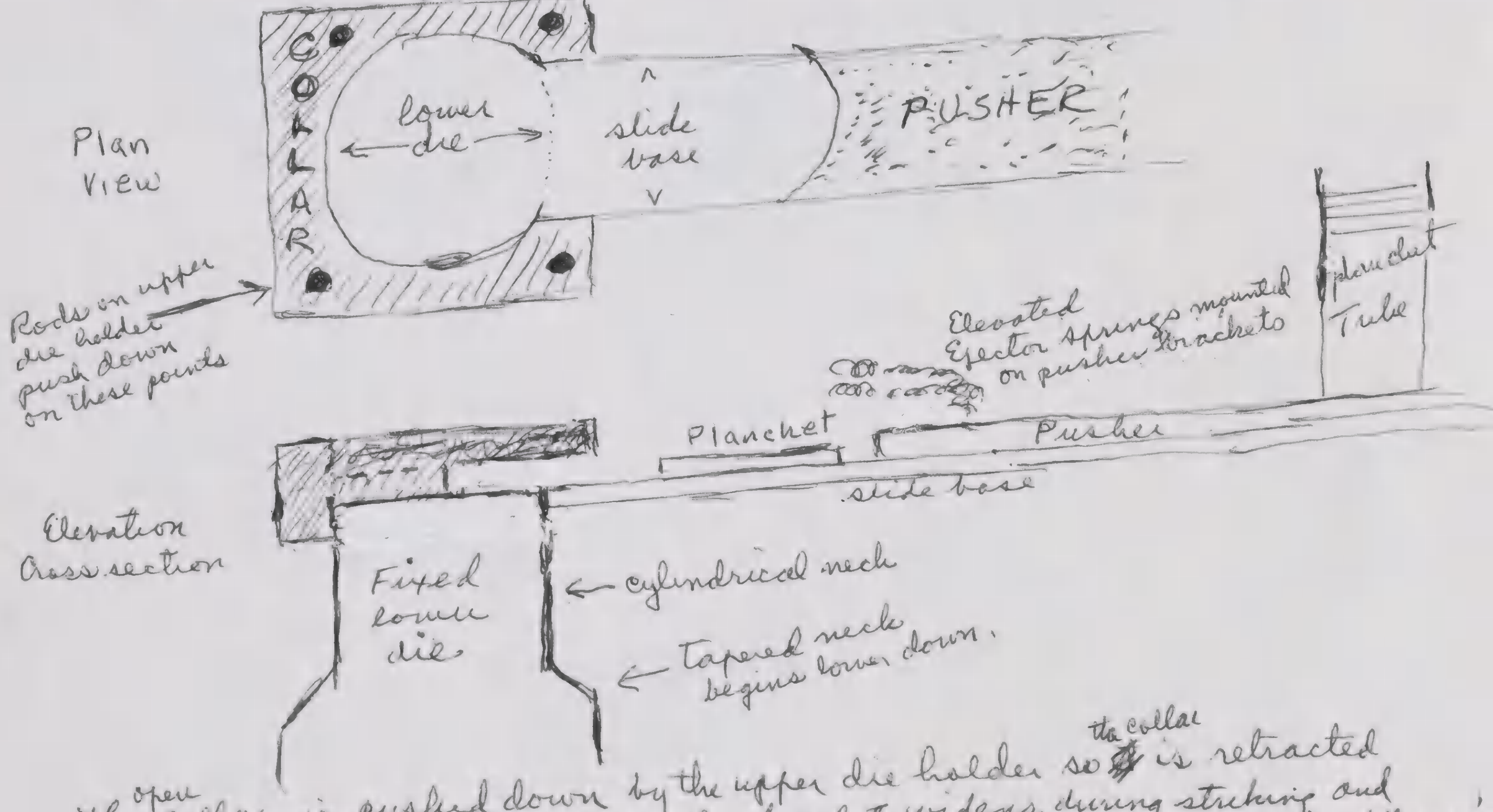
603-569-5319 Fax

4/18/00

To: Mark Borchardt.
From: Eric P. Newman 314 727 0820 Fax

The enclosed memo is my attempted reinvention of the open collar feed and ejection mechanism used initially at the first U.S. Mint. I have been working on this for ten years. It is based upon the partly cylindrical neck found on early dies rather than a fully tapered neck which was much stronger and would last much longer.

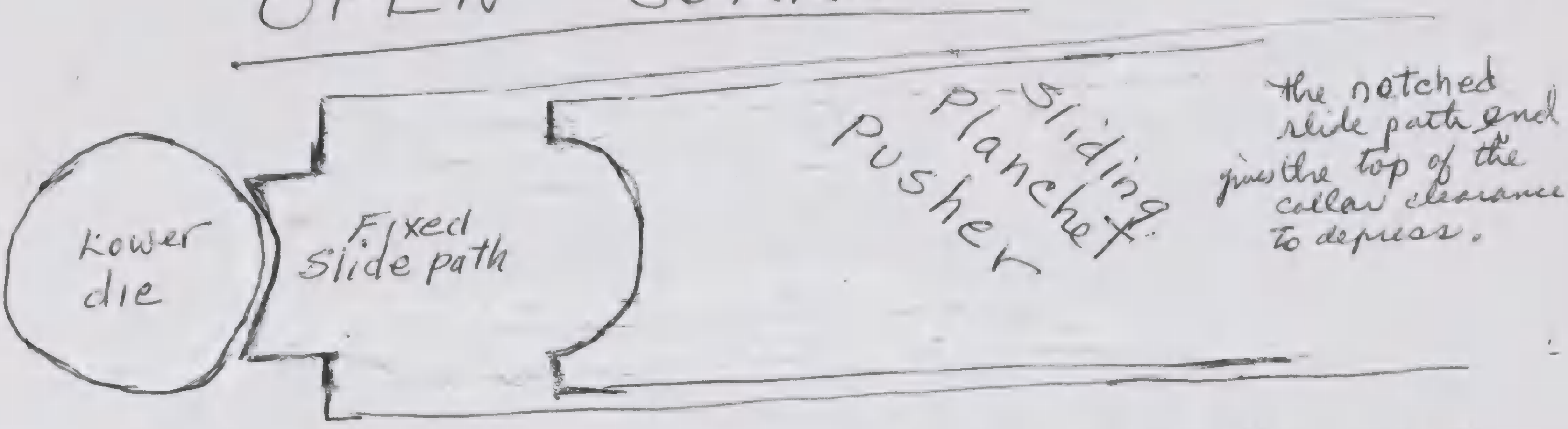
The feed would be a concave pusher which would slide forward and back picking up a planchet by gravity from a stacked tube. The planchet would be pushed forward onto the die and would be stopped by a raised collar. The pusher would have ejecting springs on its upper portion to knock the struck coin from the prior strike forward from the top of the collar into the chute on the far side beyond the die position.


COLLAR
lower die
slide base
PUSHER
Plan view
Rods on upper die holder push down on these points
Elevated Ejector springs mounted on pusher brackets
planchet Tube
Planchet
Pusher
slide base
Elevation Cross section
Fixed lower die
cylindrical neck
tapered neck begins lower down.

The open collar is pushed down by the upper die holder so the collar is retracted when striking occurs. The struck planchet widens during striking and when the upper die holder rises the collar lifts the struck coin off the die at the coin's border so the coin is easily flicked off by springs on the pusher. Entirely automatic.

I am not a good mechanical draftsman but this will have to do until one of the pros makes a detailed drawing of my hoped reinvention. Your comments will be appreciated.

OPEN COLLAR



the notched slide path end gives the top of the collar clearance to depress.

A few weeks ago I described in words the method
I decided was possible to feed and eject coins at the
U.S Mint in the 1793-1815 period using two known
facts — 1. It was described as a function using
an "open collar" & 2. The neck of the dies had a short
neck of the same diameter as the die face and the outward
flairing taper began farther from the die face.

I have received feed back indicating that my idea won't work, but nothing in writing. I made no drawings for my explanation and I am sure I did not explain my system well enough. I am no draftsman but I have tried to draw the parts. It was my fault not to present drawings, but I expected one of you (Craig Sholley, Ron Landis, Joe Rust or Peter Gaspar) to do it properly.

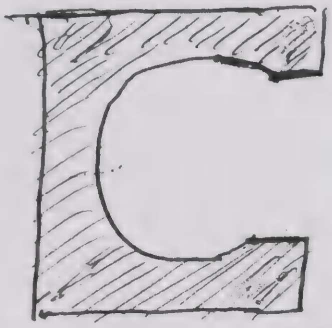
Please tell me if you find any bugs in this attempted reinvention. Refinements can be inserted as soon as the principle is agreed to.

Thank you for any prompt input. I should be hot under the collar.

Eric P. Newman

EPN
5/14/00
p.1 of 2

Plan View Slices
of One piece Collar

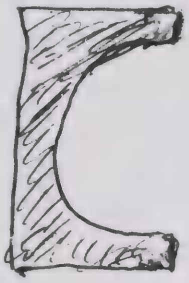


Plan view of top of Collar

this part is below bottom die face when coin is struck.

this part lifts struck coin off of lower die after striking

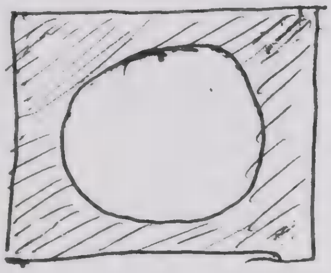
Collar projection beyond the center of the struck coi prevents the struc coin from tilting when lifted.



View of Middle Horizontal Slice of Collar

When raised this part receives pushed in planchet.

This part is also lowered below bottom die face when planchet is struck so expansion of coin diameter is not inhibited.



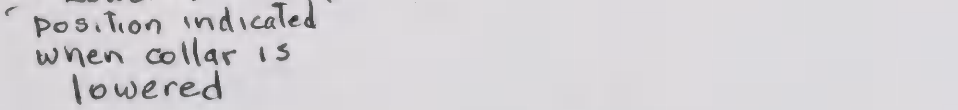
View of bottom part of Collar

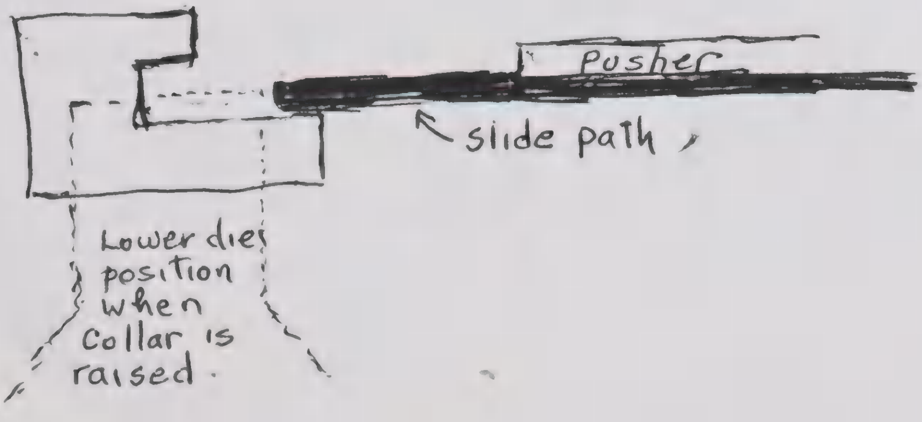
this part slides up and down on the die neck and never rises above the underside of the planchet feeding slide path.

this part restricts the collar from movement other than vertical.

this part enables collar to be removed easily when die is changed or otherwise

Side view of
Collar





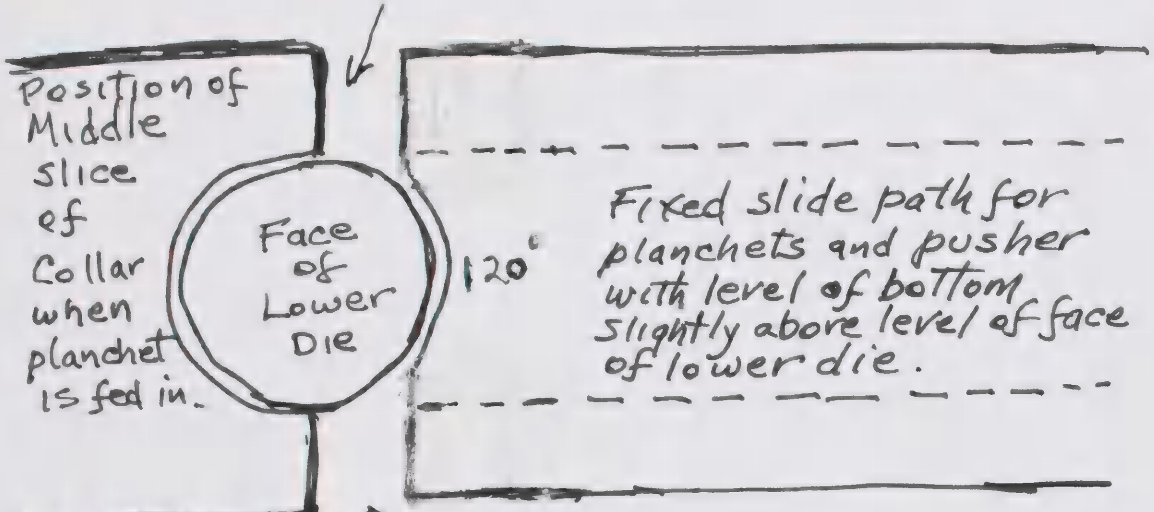
Ejector Spring attached to pusher not shown.

Collar depression rods on upper die holder not shown.

Spring or rocker for raising collar not shown.

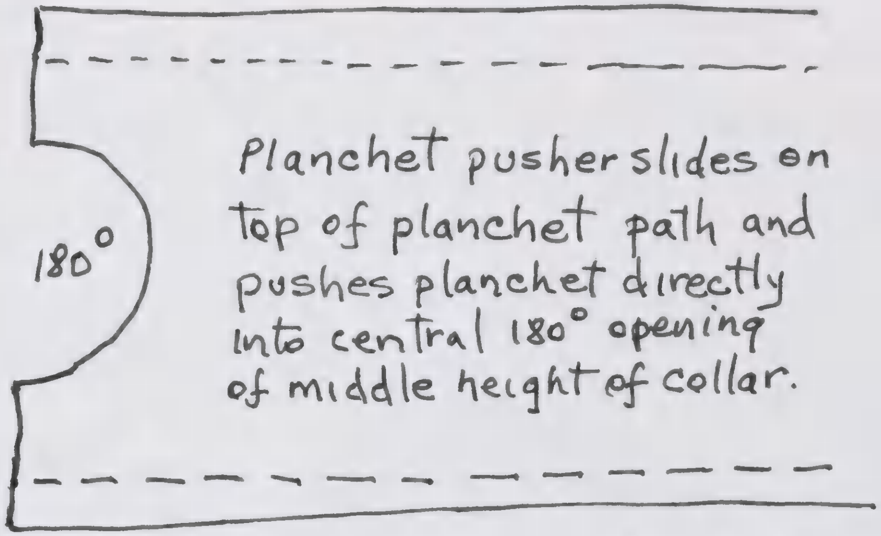
Stops to limit collar movement not shown.

EPN
5/14/00
p. 2 of 2



Position of Middle slice of Collar when planchet is fed in.

Fixed slide path for planchets and pusher with level of bottom slightly above level of face of lower die.



Planchet pusher slides on top of planchet path and pushes planchet directly into central 180° opening of middle height of collar.

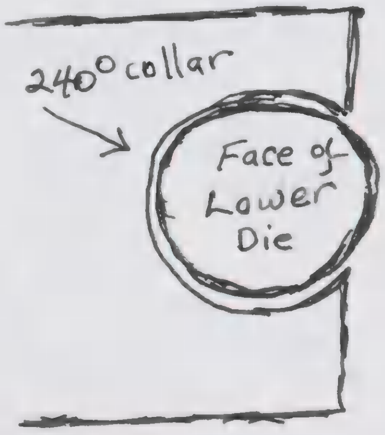
Areas cut out of fixed slide path to permit vertical movement on die neck of extended part of top of collar.

Dotted lines indicate side guides for planchet movement.

Dotted lines indicate pusher guide rails.

OPEN COLLAR

5/28/00



this part of the collar is above the space into which the planchet is fed into position and retracts below the level of the face of the lower die before striking. After striking occurs this top of the collar lifts the expanded struck coin off the lower die for ejection.

Due to challenges which I appreciate I am revising the drawing on page 1 of my submission of 5/14/00 to clarify my presentation. If the die measurements end up larger than the struck coin diameter then I will substitute an ejection system of brushing of the struck coin from the die and eliminate the top part with the 240° collar. There would still be an open collar for the automatic selling of the planchet

5/20/00

Eric:

I took a look at your drawing and added some dimensions to it. Your design cannot be built as drawn. Either your "pusher" is way too small for the planchet or your collar is way too large. To illustrate this point I've attached a drawing. The drawing is based on the following dimensions, which are based on measurements of blank planchets, cents, off-center cents, and the cent die in the ANS. Note that as I haven't studied the Lettered Edge cents in enough detail yet, the dimensions presented are for the balance of the early dates (1795 Plain Edge through 1814). This really doesn't matter as the dimensions and attendant problems with your design will remain regardless of the exact dimensions involved.

1. Diameter of die - approximately 1.100". The 1818 die in the ANS measures 1.094 - 1.097". Measurements taken from off-center and misaligned die strikes using radius gauges yields the same measurements - 1.096 - 1.100. Since the early dates are slightly larger than the middle dates, I'll hazard a guess that the dies were slightly larger and use 1.100". Again, for the purposes herein .004" is not going to make any difference.

2. Diameter of planchet - approximately 1.090 - 1.096. I've measured several blank planchets and they all measure around this. Measurements made by others and published in PW are the same (1.090 - 1.096). I also have a Type I (before upsetting) planchet that is almost certainly from Boulton and measures 1.112 - 1.116. From what I've seen .020 is about right for upsetting.

3. Diameter of collar - approximately 1.130. This dimension has been approximated from the "knife-edge" present on really sharp strikes and misaligned strikes. The "knife-edge" I've measured runs from .015 to .022, so allow a few more thousandths and the collar was about .030 larger than the die.

These dimensions set the base dimensions for the design. Every part of the design must accommodate the dimensions.

So, for your pusher we have a 180° circle that must accommodate a planchet of 1.090 - 1.096. This requires a hole slightly larger, so let's say they could hold tight tolerances and make the hole 1.098 - 1.102, or 1.100 nominal. Now that's just the semi-circle so there's gotta be metal on the edges. Let's make that .030 on each side, a little thin but what the heck. Thus your slider must measure **at minimum** 1.100 + .030 + .030 = 1.160".

Now for the collar. Given the above dimensions, we'll start with a hole (inner diameter or i.d.) or 1.130. I don't know what the outer diameter was, so let's be generous and say 2". For the purposes of this discussion the thickness is irrelevant. We now need to cut a slot in this for your pusher since you maintain that the collar was up during feeding and used as a stop. The pusher is 1.160" wide so we need to cut a slot a bit wider than that to allow the slider to fit and some tolerance for lateral movement - let's make that .020". So, the slot in the collar is then 1.180".

By now you should see the problem - the slot in the collar is .060 wider than the i.d. of the collar and .015 to .044" wider than any early date cent I've measured. This leaves your collar with an area of support for ejecting the planchet of no greater than 180°. And, since many coins are less than 1.130" in diameter (the i.d. of the collar) there would often be no area of support whatsoever. In essence, your mechanism possibly provides a way to center and strike, but the struck coin cannot be ejected!

I will also point out that I do not like the pusher at all. The design does not provide positive capture of the planchet. With only 180° of capture and a support plate underneath, a small metal chip or piece of crud would flip the planchet out of the feeder. Also, if the planchet were even slightly sprung or cupped, the pusher wouldn't even capture it. And in the case of a slight misadjustment the pusher and planchet would jam into the i.d. of the collar probably bending parts or, if misadjusted the other way, result in coins all off-center towards the pusher.

In sum, the design not only violates geometry, but it also fails all three requirements of the mechanism: it will not feed properly, it will not center properly, and the coin cannot be ejected.

I would caution you to resist the temptation to "rescue" this design by proposing all sorts of "Rube Goldberg" redesigns of the feed articulation, etc. The problem **is not** with the other parts of the press, the problem is with your design. Fix your design; do not "fix" everything else in a attempt to force your design to work.

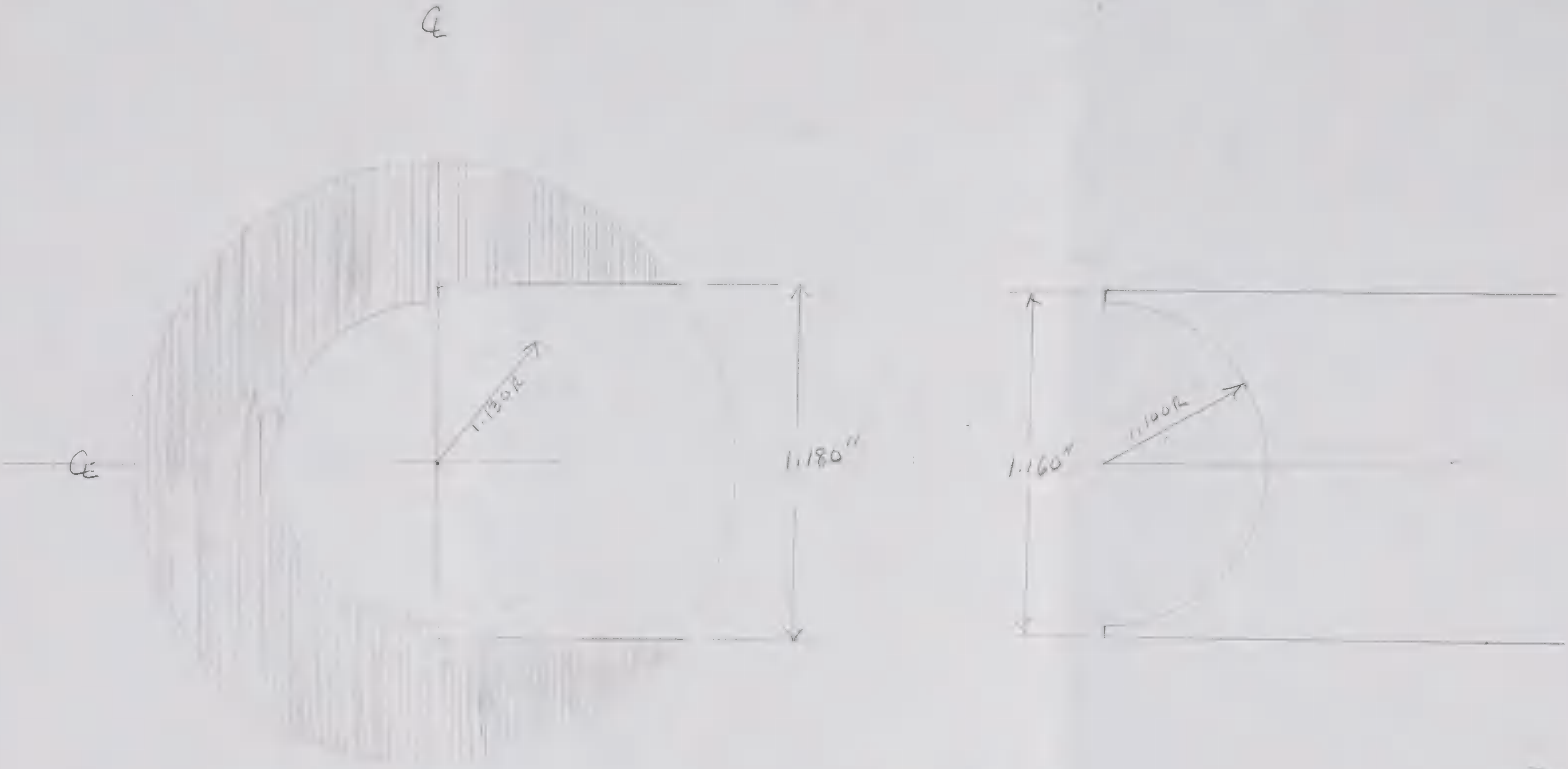
I have spoken briefly to Joe Rust about your design and am sending him a copy of both this letter and your drawing. If you'd like, Joe indicated he would be happy to machine whatever you like and test it at your expense. I'd really suggest a redesign before this - it would make no sense to waste money producing parts that won't work.

I'm also sending Joe the drawing of Boulton's screw press (with the feed mechanism and collar), the photos of the dies, and a brief description of my idea of using a few rods or "standoffs" to depress collar during striking. This remains the only viable design so far. Perhaps Joe can come up with a more elegant design, the crudeness of mine being the only point I still do not like.

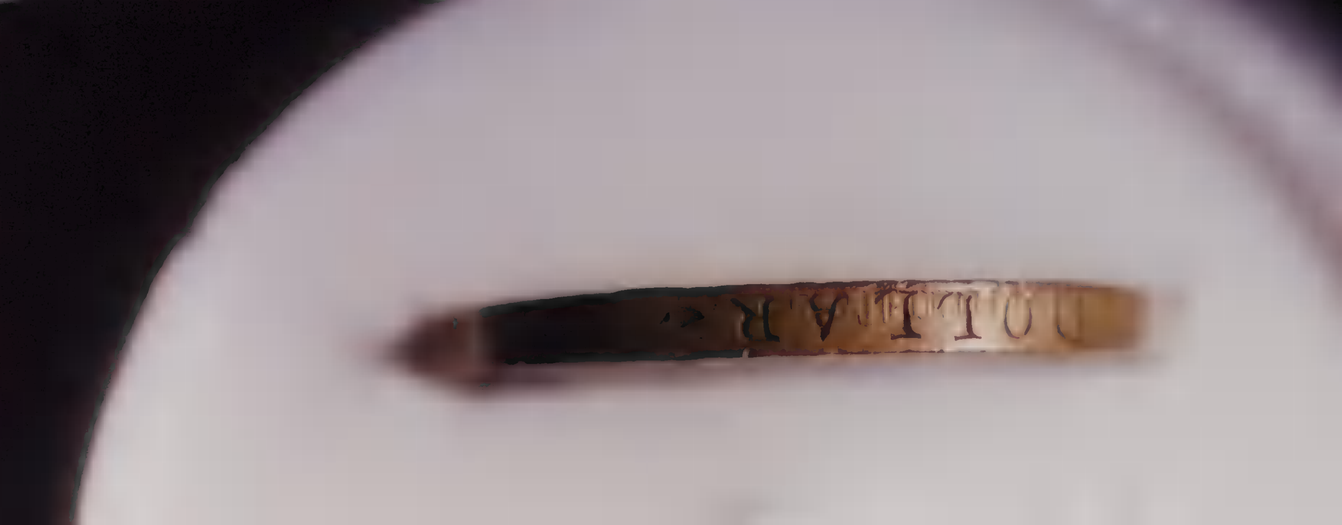
Lastly I note that the Lettered Edge cents may have been struck in a collar obviating the speculation on what this looked like at least of the cents. Enclosed is a photo of S71 showing markings on the edge. I've been aware of this for some time, but this coin is particularly hi-grade and you can really see what's going on. As you will note the metal has been distorted and smeared over top of the letters and several letters have been crushed. The markings are not cause by the rimming machine as different letters are involved on different coins. Additionally, the marks occur along different areas of the circumference (I check against the bust, legends, denom, etc). Both Noyes & I feel this is evidence of collar contact. I have described this to Joe Rust and, pending his review, he tentatively agrees. This defect occurs on at least one other variety of 1794.

Best, Craig

SCALE: 2:1



Won't work,
CBS 5/20/00 — Point MADE!!



OLLAR

from Craig Sholley. 5/20/00

ERIC P. NEWMAN NUMISMATIC EDUCATION SOCIETY

6450 Cecil Avenue, St. Louis, Missouri 63105

June 5, 2000

To: Craig Sholley
109 Big Springs Ave
Newville, PA 17241

From: Eric P. Newman

I appreciate your extensive input on my theoretical design of a possible early feeding and ejecting mechanism. The actual sizes of the planchets, coins, dies, etc. have given me the opportunity to modify my ideas somewhat and still comply with the 3 parameters of (1) automatic feeding and ejection, (2) open collar, and (3) die neck diameter the same as die diameter.

I have accordingly entirely eliminated the top section of the previously submitted collar and am using only the central part and the lower part of the collar. The former central part will move to the top of the collar leaving a 180 degree concave cut out, but will have flat wings which will meet the flat wings of the pusher which also has a 180 degree concave cut out on the pushing end. The former lower part of the collar being a 360-degree ring around the die neck will be directly below the open collar part. The slide path will be full width. The only major change in procedure is that the struck coin will not be lifted off of the lower die but will be swept, brushed or pushed off the die by a sweeper which is automatic and may be separately activated by the screwpress rather than be on the front of the pusher. The sweeper must operate immediately after the striking and before the open collar rises. No part of the 360-degree lower collar ever rises above the level of the underside of the slide path or the lower die face. As changed the revised mechanism will be much simpler and much more open. It is easy to machine, uses the die neck easily and justifies the open collar name. It will accommodate lettered edge or plain edge pieces without deforming them. It will usually produce coins very slightly off center because there will be a tiny bit of space between the collar diameter and the planchet diameter in various directions, the die being slightly larger than the planchet. Thus the struck coin will have its dentils of slightly different length in different parts of the perimeter as the coins actually do.

Now you can straighten me out again. Perhaps this time I have passed the test. You may wish to draw this concept if it is a realistic possibility.

ERIC P. NEWMAN NUMISMATIC EDUCATION SOCIETY

6450 Cecil Avenue, St. Louis, Missouri 63105

To: Mr. Craig Sholley
109 W. Big Spring Ave
Newville, PA 17241

June 20, 2000

From: Eric P. Newman

The beautiful U.S. Mint Steam Coinage Press has given birth to a gem and I thank you for sending me one. It will be put next to my original of the token struck from the same machinery long ago. You and the Gallery Mint experts must have had fun bringing the mechanism back to life.

I am patiently awaiting your drawings or comments on the last draft of the feeding mechanism for the pre-1815 screw presses. How can I come up with new ideas unless you make me junk the old ones? It's fun to work with you.

My sincere appreciation.

Subj: **Die Cups**
Date: 07/08/2002 5:52:39 PM Central Daylight Time
From: craigs@pa.net (Craig Sholley)
To: ericnumis@aol.com (Eric Newman)

Hi Eric,

Bob J told me you were trying to figure out what the die cups looked like. I was surprised you hadn't figured this out already. The answer, well most of it, is sitting in the ANS. Just look at the dies. They pretty well set the dimensions. The photos of the '23 Restrike dies also help set the cup id 'cause the dies show a lot of bulging. Then all you need is the properties of the steel at that time, which is about the same as a straight 1% carbon today (see Swank, "History of the Manufacture of Iron & Steel in All Ages", 1965 reprint and Tweedle, "Sheffield Steel and America", 1987). Take that info, use good design practices (you can use Marks' Mechanical Handbook), the properties from a good metals handbook, and bingo - you 're gonna get as close as you can get without seeing one.

See ya in NY.

Best, Craig

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I need your comments on my reinvention of the open collar design and want to give you a little more detail. The piece that slides up and down on the lower die neck has two horizontal cross-sections. The lower one is a solid ring which holds the element onto the die neck and which never rises as far as the lower die face. The upper section has a concave half circle with an opening toward the slider-feeding arm. The slider-feeding arm has a concave half circle facing the die and pushes the planchet toward the top section of the vertically operating ring,the top of which rises enough to stop the planchet from being pushed too far when the top of the ring has risen to the upper position. The equipment has no tongs as the European feeders had. When the coin is struck the slider has pulled back to receive a new planchet from the tube and the top of the vertically operating ring has been depressed below the level of the die face.The slider is operated by an arm on the screwpress and the vertically operated ring can be moved with fingers on the slider.The ejection brush or sweeper spring can be operated separately. It can be a four-armed horizontal rotator which turns 90 degrees after each strike as soon as the die rises. It will then be out of the way of the collar and the slider arm. If I am not clear in any of the explanations please let me know. I have sleepless nights because I cannot turn off my noodle on this subject. Eric

Subj: **Mery Xmas All**
Date: 12/25/2001 8:19:04 AM Central Standard Time
From: craigs@pa.net (Craig Sholley)
To: TDR1798@aol.com (Tom Reynolds), billmaryott@irisgarden.com (William Maryott), SDowney3@aol.com (Sheridan Downey), mark@bowersandmerena.com (Mark Borckhardt), mdfurman@pa.net (Malcolm Furman), kbressett@pcisys.net (Ken Bressett), JohnK@bowersandmerena.com, thejohn@qtm.net (John D Wright), jrg@epix.net (Jim Garraway), gcvanga@gateway.net (Glenn van Gaalen), ericnumis@aol.com (Eric Newman), esouders@gatecom.com (Edgar Souders), dick.johnson@snet.net (Dick Johnson), cfheck@ix.netcom.com (Charles Heck), rwjulian@netusa1.net (Bob Julian), barndoor@bowersandmerena.com

Merry Christmas & Happy New Year to All. Happy Hanukkah to Eric. To John K., lemme cut off that pony tail :-)!

To brighten your holidays, some jokes for all:

1. What do you get when you cross Lassie with a cantaloupe? A melon-collie baby! (no groaning allowed or I'll send you more of these)

2. Two hunters from New Jersey are out in the woods when one of them falls to the ground. He doesn't seem to be breathing. The other pulls out his cell phone and dials 911. He gasps to the operator: "My friend is dead, what can I do?"

The operator says, in a calm, smooth voice, "Just take it easy. First, let's make sure he's dead."

There's a silence, then a shot. The guy comes back on the line and says: "OK, now what".

Best, Craig

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From: "Craig Sholley" <craigs@pa.net>
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        "William Maryott" <billmaryott@irisgarden.com>,
        "Sheridan Downey" <SDowney3@aol.com>,
        "Mark Borckhardt" <mark@bowersandmerena.com>,
        "Malcolm Furman" <mdfurman@pa.net>,
        "Ken Bressett" <kbressett@pcisys.net>, <JohnK@bowersandmerena.com>,
        "John D Wright" <thejohn@qtm.net>, "Jim Garraway" <jrg@epix.net>,
        "Glenn van Gaalen" <gcvanga@gateway.net>,
```

ERIC P. NEWMAN NUMISMATIC EDUCATION SOCIETY

6450 Cecil Avenue, St. Louis, Missouri 63105

To: Craig Sholley
1618 Walnut Bottom Rd.
Carlisle, PA 17013

January 8, 2001

From: Eric P. Newman

Re: Strawberry Leaf U.S. Cents

In this last millennium you sent me a 5 page article you wrote entitled "The Strawberry Leaf Cents-Real or Counterfeit?" This followed a telephone conversation this Christmas in which you asked me to obtain the diameters of the Strawberry Leaf Cent owned by ANS. I requested those measurements for you immediately.

You and Holmes permitted me to see the Holmes pieces at the Philadelphia ANA Convention and I was appreciative. I concluded that the edges were decorated as on other vine and bars 1793 cents and as I expressed to Kleeberg long ago I feel that no one would counterfeit a copper coin for circulation and put a decorated edge on it. I never used the word "counterfeit" to you or to anyone else as to the Strawberry Leaf cents. I stated that they might be 19th century alterations of genuine cents. I took no position and yet you state "Eric's argument fails on several points." I did not say that fusing could have taken place but mentioned that expert tooling could have been done. Added material would ordinarily show up in an x-ray. Smith of Ann Street alterations of 1793 cents about 1860 are tooled gorgeously and metal was moved (possibly using heat) into different positions and shapes. I did not comment upon tooling of rare varieties as compared to tooling more common varieties.

You are and must feel free to write whatever you wish as long as it is sincere. All I am doing is pointing out what I said. I have never expressed or written any opinion on the pieces, but am happy to discuss research thoughts with you or anyone working on a topic. We have a fine relationship and it will stay that way. Differences of opinion on hanging chad or otherwise are normal. Keep up the good work as solutions to complex problems are often elusive. Ain't we got fun?

Subj: **The Strawberry Leafs**
Date: 02/15/2001 4:59:17 PM Central Standard Time
From: craigs@pa.net (Craig Sholley)
To: ericnumis@aol.com

Hi Eric:

I'm going to send Harry Salyards a short note to publish in the next PW. It'll be called "More On The Strawberry Leaf Cents". In it I'll state the following if you concur:

After reading my article on the Strawberry Leaf cents in the January 2001 issue, Eric Newman wrote to let me know that I had misunderstood some of his comments to me. Specifically, Eric noted:

"You and Holmes permitted me to see the Holmes pieces at the Philadelphia ANA Convention and I was appreciative. I concluded that the edges were decorated as on other vines and bars 1793 cents and as I expressed to Kleeberg long ago, I feel that no one would counterfeit a copper coin for circulation and put a decorated edge on it. I never used the word "counterfeit" to you or anyone else as to the Strawberry Leaf cents. I stated that the might be 19th century alterations of genuine cents."

Eric's comment regarding the Holmes pieces refers to a little demonstration that Dan Holmes and I put on with his Strawberry Leaf cents. These were stacked with other low grade 1793 Wreath cents in such a manner so that only the edges could be viewed. Several people were asked to pick out the Strawberry Leaf cents. No one could. In fact, no one could identify any point of difference on the edges.

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Subj: **Just a quick hello**
Date: 09/24/2001 3:45:43 PM Central Daylight Time
From: craigs@pa.net (Craig Sholley)
To: ericnumis@aol.com (Eric Newman)
CC: rwjulian@netusa1.net (Bob Julian)

Hi Eric:

Haven't emailed or spoken w/ you in a while, so thought I'd drop a line to say hi. I would have emailed sooner, but I lost your address for a while. It was buried on my desk - I file by "sedimentation rate" and just needed to hit the "right strata". I asked Julian for your email, but he was gonna ask me (hence the cc).

Anyway, hope you are doing fine. Everything here is ok.

Best, Craig

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Subj: **Re: Just a quick hello**
Date: 09/25/2001 2:33:48 PM Central Daylight Time
From: EricNumis
To: craigs@pa.net

Craig: Always glad to hear from you. I read your portion of the Breen Encyclopedia which we can discuss further. I am very concerned about other parts of the book particularly a few of the obsolete, inaccurate and omitted pedigrees. There are also the usual differences of opinion as to condition. When a book is written by a group there is always a risk. My best. Eric

Subj: **Die Cups**
Date: 07/08/2002 5:52:39 PM Central Daylight Time
From: craigs@pa.net (Craig Sholley)
To: ericnumis@aol.com (Eric Newman)

Hi Eric,

Bob J told me you were trying to figure out what the die cups looked like. I was surprised you hadn't figured this out already. The answer, well most of it, is sitting in the ANS. Just look at the dies. They pretty well set the dimensions. The photos of the '23 Restrike dies also help set the cup id 'cause the dies show a lot of bulging. Then all you need is the properties of the steel at that time, which is about the same as a straight 1% carbon today (see Swank, "History of the Manufacture of Iron & Steel in All Ages", 1965 reprint and Tweedle, "Sheffield Steel and America", 1987). Take that info, use good design practices (you can use Marks' Mechanical Handbook), the properties from a good metals handbook, and bingo - you 're gonna get as close as you can get without seeing one.

See ya in NY.

Best, Craig

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Subj: **Re: DIE CUPS**
Date: 10/26/2002 8:24:37 AM Central Standard Time
From: hvymtl@pa.net (Craig Sholley)
To: EricNumis@aol.com

Hi Eric,

Great to hear from you! How the heck you been???

Sorry for the incomplete explanation. Thought that you would understand given your finds of press drawings - my bad :-(!

Die cups (or stakes) are die holders. The dies go in the die cups, which are bolted to the press - 1 for each die, just like today.

The dies in the ANS can be used to get an idea of the dimensions.

First off, the die cups had to have an I.D. greater than the O.D. of the die (of course). You then have to add some tolerance for variation. And then add some more to allow for bulging of the die during use so that this doesn't jam the die in the cup or break the cup. Looking at the 1823 Restrike Dies, I came up with die O.D. + ..200".

Height of the die cup is pretty well indicated by the "set screw dimples" on the dies. One set bolt was used on smaller dies, 2 for larger dies like the half dollar. These passed thru the die cup & engaged the dimple to lock the die in place. The distance of the dimple from the bottom of the die helps set the height of the die cup by indicating what the Mint found in practice to be the min. height to prevent fracturing. So, the distance from the top of the cup to the center of the bolt hole would be at least the same as that from the bottom. Looking at these dimensions, I came up with about .750 for the height of the die cup cylinder, and same for the thickness. These dims fit well with the mech. props of 1% carbon steel.

The you add a base plate .500 thick and say 3" in dia with the die cup cylinder in the center and bolt holes every 90 degrees on a 2.50 bolt circle. Not coincidentally, the end result is remarkably like the die holder shown the drawings of the Boulton press from the 1824 Britannnica you sent me - see plate LXIV, fig.6.

Reason I choose a round base plate is that it is eaiser to machine a round billet than hand forge a square base with a round cylinder in the center. My guess for maufacturing: Take a 3" dia billet (fairly standard size according to recs I've seen), cut a 1.4" thick piece off, machine the required dia hole in the center, machine the OD of the cylinder, dress up the height & base plate thickness, drill bolt holes, thread set bolt holes, harden, temper, done.

I'll send a drawing if you want.

Best, Craig

> ----- Original Message -----
> **From:** EricNumis@aol.com
> **To:** HVYMTL@PA.NET
> **Sent:** Thursday, October 24, 2002 7:24 PM
> **Subject:** DIE CUPS
>
> **Dear Craig: When I last asked you about the use of die cups in the early US Mint operations you referred me to the evidence of the early dies which ANS has. I have been thinking about the matter and I need more explanation of what may be obvious to you but not to me. Were the die cups on both the upper and lower dies,**

> **what shape were the die cups, did the cups move other than with the dies, how were they attached to the dies, did the die cups break by expansion of the die neck, what if any relationships did the die cups have to planchet placement or ejection, etc.? Perhaps a sketch would be helpful if that were easier.**
> **I hope you are fine and I look forward to hearing from you.**
> **Eric**

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To: <EricNumis@aol.com>
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Subject: Re: DIE CUPS
Date: Sat, 26 Oct 2002 10:23:45 -0400
MIME-Version: 1.0
Content-Type: multipart/alternative;
   boundary="----=_NextPart_000_0010_01C27CD9.C3A45730"
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X-MSMail-Priority: Normal
X-Mailer: Microsoft Outlook Express 6.00.2800.1106
X-MimeOLE: Produced By Microsoft MimeOLE V6.00.2800.1106
X-MailScanner: Found to be clean
X-MailScanner-SpamCheck: not spam, SpamAssassin (score=1.2, required 6,
DEAR_SOMEBODY, DOUBLE_CAPSWORD, SUPERLONG_LINE, MAILTO_LINK, AWL)
```

Subj: **Re: Die cups**
Date: 10/31/2002 6:57:35 AM Central Standard Time
From: hvymtl@pa.net
To: EricNumis@aol.com
CC: hvymtl@pa.net

> Craig: It was so nice to hear from you. I think I am fine but I have to make
> physical repairs from time to time due to deterioration.

Me too. Btwn a bad heart (5 heart attacks, 1st one killed me)& rheumetiod arthritis in my right shoulder, most days I feel like I've been beat with an axe handle.

On to die cups. Die cups are die holders. Used to afix the dies to the press. Same as today, die holder (cup) bolts to the press & die goes in the die holder (cup). Because of their shape they kinda look like a cup and saucer, hence the name. "Die cup" is a colloquialism. Take a look at the illustration plate in the Brittanica you sent & you'll see what I mean - shows a die in a die cup.

Die cups did nothing other than provide the mechancal means to afix the dies to the press. Had nothing to do with centering the planchet, ejecting, etc. They just had to hold the die, bolt to the press & not interfere with the rest of the mechanisms.

Early dies had 3 basic forms:

1. Cylinder on polygon base
2. Cylinder on cylinder base
3. Frustum (truncated cone) on cylinder base.

Most early dies had no taper before the "neck" area. They were merely a machined cylinder on a larger polygonal or cylindrical base. The face of the cylinder was the die face. Die cups were only about the height of the base (often less).

Half dollar (and likely dollar, tho' no early dollar dies survive) were different due to increased stresses. They had a "frustum on cylinder design", with the die face being the face of the frustum. Doing this provided maximum support to the die face, essentially eliminating rim breaks(cud, seen one on a bust half or dollar? not many!) and other fracturing.

See my article from the 1996 COAC - "Early US Coinage Dies in the ANS Collection". If you don't have a copy, I can send one.

Best, Craig

This message was sent using PAdotNET WebMail.
http://www.pa.net/

---------------------- Headers --------------------------------

Subj: **Re: Open Collar**
Date: 5/31/2004 5:58:02 PM Central Standard Time
From: hvymtl@pa.net
To: EricNumis@aol.com

Eric:

1. A feeding mechanism has specific mechanical requirements for action, location and clearance. All European mints and the US Mint's later steam presses used the same basic mechanism, thus evidencing that this is a "fundamental design". The feed finger design can be seen in both Cooper and the Britannica.

2. The location, clearance, and action of the feed fingers along with the necessary exit chute thus fixes the available area and clearance for the collar. This area is insufficient for the design you propose. Additionally, the ejection action of your rotating design duplicates the ejection action of the feed fingers and is thus at best "repetitiously redundant". More likely the action of your rotating design would present very difficult timing problems and result in jams.

3. My point on Sellers was not re the feed fingers themselves, but rather a more fundamental point: As I said, a review of Seller and other historical mechanical texts shows that American mechanical technology was the same as that in Europe. This is not surprising since all of the U.S. engineers at this time were either immigrants or sons of immigrants, and as part of the "merchant class" had regular contact with Europe. The fundamental point I am trying to make is that the mechanical technology of the time in the US and Europe **IS THE SAME**. In furtherance, I do not believe that the feed mechanism was the "hush-hush, military state secret" some try to make it. The historical texts clearly show that this is a widely used commercial technology - the French used it, the Germans used it, the British used it, and the US used it. It astounds me how few can seem to grasp this concept. "It's simple fellas", our hammers looked like theirs, our plows like theirs, our lathes like theirs, etc., etc. Just read a few historical mechanical texts - NO FUNDAMENTAL DIFFERENCE. So, the point is the technology was the same and the feed mechanisms were the same. No secret, no big mystery, just follow the historical trail.

3. Ejection was accomplished by the feed finger which served to both place the unstruck planchet and eject the struck coin. This action is clearly described in Cooper and Wailes and can be seen by virtue of the design. The Mint's first steam press that Gallery Mint rebuilt had the same basic design. It was interesting to see how closely its action corresponded to Cooper and Wailes. In fact, it would be quite foolish to design a feed finger that would not by its very nature push the struck coin off the die during feeding. One could, of course, design a feed finger to "drop" the planchet from above the struck coin, but that would necessitate a second mechanism to eject the struck coin. That sort of mechanism is a very silly proposition since the more complex the mechanisms and timing the more likely they would jam. And, "dropping" the planchet makes the requirement of reliable placement quite nasty. On the other hand, one could simply take advantage of the feed motion to eject the coin, which of course they did.

4. While Sellers is not clear on the feed mechanism, Wailes is. In fact, Wailes' description is very accurate save for the part about the fingers imparting the reeding. There is NO QUESTION about his accuracy once one sees the action of the feeding mechanism on the Mint's first steam press.

5. Die cups do not preclude feeding mechanisms or collars. In fact, all presses **MUST AND DO HAVE DIE CUPS.** Even modern presses must have die cups. A holding fixture is required and has specific mechanical requirements (another "fundamental design"). The early screw press die cup designs can be seen in both Cooper and the Britannica.

6. From the forgoing and my previous discussion, the mechanical requirements drive the design of the collar (either open or close) and lead to the one obvious design of a depressible collar. One cannot escape the simple fact that the collars and feed mechanisms were the same in France, England, Germany and the U.S. Four countries with 3 different press designs (manual screw, Boulton's steam driven screw, and Uhlhorn's toggle-joint) all used the same collar and feed designs. In fact, it isn't until the later twentieth century that the feed mechanism is significantly changed (rotary feed table is designed for the modern hi-speed hydraulic presses). **THIS FACT SHOULD SPEAK VOLUMES**.

7. I do not believe Eckfeldt had anymore to do with the feed fingers than he had to do with the hardening process. The best evidence is that Harper developed a slightly improved action and the Mint adopted it. This is not monumental, take a look at Cooper and Boulton's design in Britannica - slight differences, slight improvements. The Mint's first steam press likewise showed slight modifications and had a much smoother action than the French design in Cooper or Boulton's design would have had. That's what SHOULD BE the subject of discussion - improvements in basic design not "radical surgery" or a new way to stand on your head and spit nickels.

8. As to colonials, Joe Rust of GMM came up with what I called a simplified version of the feed fingers. The basic design and action was again (and not surprisingly) the same. Joe had not developed the "camming" to drive his version of the feed fingers on a screw press as GMM had no need with such little production and developing the camming for proper timing is a time consuming effort. Additionally, I noted that the simplified version being less precise in action would result in more off-center strikes. This may be applicable to colonials given the relatively large number of off-centers seen.

Best, Craig

----- Original Message -----

> **From:** EricNumis@aol.com
> **To:** hvymtl@pa.net
> **Sent:** Saturday, May 29, 2004 7:15 PM
> **Subject:** Re: Open Collar
>
> Dear Craig:
> Thank you for your response to my feed and ejection mechanism suggestion. I appreciate your points and am giving further thought to them.
> The size of the frame seems adequate to me as half of the rotating mechanism can be outside the frame and clear its supports when turning.
> You did not comment on the ejection so I assume you feel that a spring on the front of the feed fingers was used.
> I feel that a depressible collar is not possible when using die cups which we positively know they did. It has to be a half collar or less to be called an open collar. I feel Sellers is not clear on the point. I feel that Eckfeldt might
> have invented something new as the open collar was not used in Europe. Perhaps the Connecticut Mint used an automatic feeder previously (1785 etc.) which was unlike the European type as Fugio coins also were mechanically fed and not hand fed.
> I would appreciate your further comments on the above thoughts.
> Numismatic mysteries are really fun. Eric

Subj: **Just a quick hello**
Date: 09/24/2001 3:45:43 PM Central Daylight Time
From: craigs@pa.net (Craig Sholley)
To: ericnumis@aol.com (Eric Newman)
CC: rwjulian@netusa1.net (Bob Julian)

Hi Eric:

Haven't emailed or spoken w/ you in a while, so thought I'd drop a line to say hi. I would have emailed sooner, but I lost your address for a while. It was buried on my desk - I file by "sedimentation rate" and just needed to hit the "right strata". I asked Julian for your email, but he was gonna ask me (hence the cc).

Anyway, hope you are doing fine. Everything here is ok.

Best, Craig

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----------------------- Headers --------------------------------
Return-Path: <craigs@pa.net>
Received: from  rly-yd05.mx.aol.com (rly-yd05.mail.aol.com [172.18.150.5]) by air-yd03.mail.aol.com (v80.17)
with ESMTP id MAILINYD37-0924164543; Mon, 24 Sep 2001 16:45:43 -0400
Received: from  mail.pa.net (emh1.pa.net [205.166.61.145]) by rly-yd05.mx.aol.com (v80.21) with ESMTP id
MAILRELAYINYD53-0924164529; Mon, 24 Sep 2001 16:45:29 -0400
Received: from craigs.pa.net (duppp389.lncstr2.lancaster.pa.net [151.205.241.133])
   by mail.pa.net (Postfix) with SMTP
   id 81A453A61B; Mon, 24 Sep 2001 16:45:25 -0400 (EDT)
Message-ID: <000901c1453a$7eed86c0$85f1cd97@pa.net>
From: "Craig Sholley" <craigs@pa.net>
To: "Eric Newman" <ericnumis@aol.com>
Cc: "Bob Julian" <rwjulian@netusa1.net>
Subject: Just a quick hello
Date: Mon, 24 Sep 2001 16:49:31 -0400
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Content-Type: text/plain;
   charset="iso-8859-1"
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X-Mailer: Microsoft Outlook Express 5.50.4807.1700
X-MimeOLE: Produced By Microsoft MimeOLE V5.50.4807.1700
```

Answered

Phone: 212/234-3130
Fax: 212/234-3381
E-mail: Info@AmNumSoc.Org

THE·AMERICAN·NUMISMATIC·SOCIETY
(FOUNDED 1858 · INCORPORATED 1865)
BROADWAY·AT·155TH·STREET
NEW·YORK·N.Y. 10032

September 09, 2002

Mr. Eric P. Newman
Eric P. Newman Education Society
6450 Cecil Avenue
St. Louis MO 63105

Dear Eric:

Enclosed, please find copies of the item(s) requested, which are sent to you with the compliments of the library staff.

Wishing you all the best, I remain

Sincerely Yours

Frank

Francis D. Campbell
Librarian
Campbell@amnumsoc.org

The attached transcription is
all there is concerning
illustration 8 and Fig. 3

Thompson, Samuel. An essay on coining. 1783

P. 26.

After they are cutt (sic.), they are Nealed and made exceeding clean, they are brought to this Fly or press to receive the impression, from the Dies.

To do two Thousand will take two men one day and a half.

Figure the third is a Die, the exact shape and size of those used in the Tower.

P. 27 = Illustration No. 8 and Fig. 3rd.

P. 28. = Blank
P. 29 = Blank

P. 30.

When the impression is struck on them, they are adjusted to the weight, if too heavy, by filing them round the edges, in this there is a wast (sic.) on the filings in the melting them, of about twelve penny weight.

Eric,

Illustration 8 includes the letters A through F, which are not explained in the text. There are no Q's. The tiny circles with the lines through them are screw heads. You may not be able to see all of the letters on your copy of the illustration. If you call, I can tell you where each letter is located.

Regards,

Frank

ERIC P. NEWMAN NUMISMATIC EDUCATION SOCIETY

Mr. John Dannreuther
868 Mt. Moriah, Suite 202
Memphis, TN 38117

March 23, 2004

Dear JD:

In reading over parts of your wonderful second edition to Official Guide to Coin Grading and Counterfeit Detection I note that you have not changed the definition of "open collar" on p. 397 and you use the expression on pages 22, 52, and 53. I answered you on August 31, 1998 that I thought your text should be changed but I see it was not. You had written me on August 26, 1998 . You probably relied on Breen but I believe Breen was thinking of the nippers which were described in Cooper but that nippers were not used until the second or third decade of the 19th century at the U. S. Mint as I see it. The weakness of the 1830 half dollar picture you show was caused by die level misalignment.

I have been thinking about the matter for years and have just sent to Gallery Mint and Craig Sholley my new ideas. I think I solved the problem and am enclosing a copy of my drawing and explanation. Please study it and give me your thoughts. Do not disclose it or discuss it with anyone without my approval. This open collar matter has kept me awake at night for so long that I can now go to sleep and think of something else. Open collar meant a collar with an opening, not a collar which opened or a collar which was a full circle. It did not restrain or affect striking, it only affecting placing the planchet over the lower die I believe. I considered and finally rejected a rising from the level of the face of the lower die and then depressing for the strike but the early use of die cups to make dies last longer would make that impractical.

Now that I have collared you, bark back.

Sincerely,

Eric P. Newman

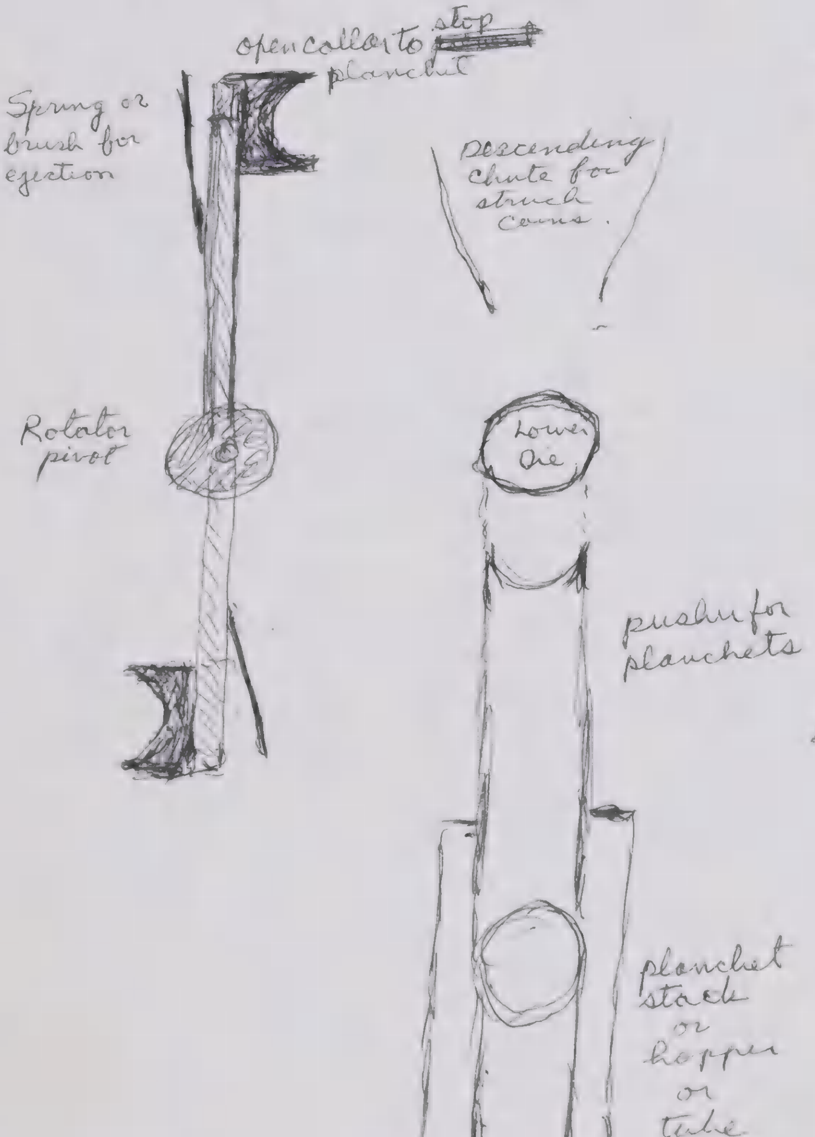
6450 CECIL AVENUE ST. LOUIS, MISSOURI 63105 ERICNUMIS @ AOL.COM

Peter Gaspar: Please comment before I send this to Sholley and Golley Mint

EARLY US MINT EJECTOR MECHANISM

(Eric P Newman)

For many years I have been attempting to ~~determine~~ reinvent what ~~the~~ mechanism ~~what~~ was ~~for~~ used for the feeding of planchets and ejecting of struck coins at the US Mint's 18th century ~~operations~~ and early 19th century operations. It was an automatic operation and was specifically described in part as using an "open collar". What an open collar was has never been determined but the change to a "close collar" is well understood. ~~In the beginning~~ Screw presses were used, fed by the Boulton type automatic feeding device using ~~from~~ a vertical tube full of planchets and a reciprocating pusher below ~~it~~ the tube to push the planchets forward horizontally on a slide onto the lower die one at a time. The only mechanism I can envision complying with the "open collar" description is as follows:


open collar to stop planchet
Spring or brush for ejection
Descending chute for struck coins.
Rotator pivot
Lower Die
pusher for planchets
planchet stack or hopper or tube

Open collar element is thicker than planchet to help put planchet in position to prevent pusher from sliding planchet too far.

Spring or sweeper knocks struck coin from die after screw press begins to rise from striking.

Rotator moves 90° each movement. actuated by screw press motion.

After open collar sets planchet in position it is rotated 90° to avoid being near die during striking because planchet expands when striking occurs and open collar must be clear of descending upper die during striking.

Pusher must be actuated forward as soon as open collar is set and pusher must withdraw before striking.

Rotator does not interfere with feeder pusher because pusher is withdrawn when rotator turns.

Level of bottom of rotator is virtually the same as the face of the lower die and the support for the pusher

No nippers as shown in Cooper were used or the open collar would not be a proper description.

The open collar may be less than 180° and slightly spread at its outer ends.

The guide rails for the pusher are always clear of the rotator.

The actuators for the rotar and the pusher can be determined after the principle of the movements is determined.

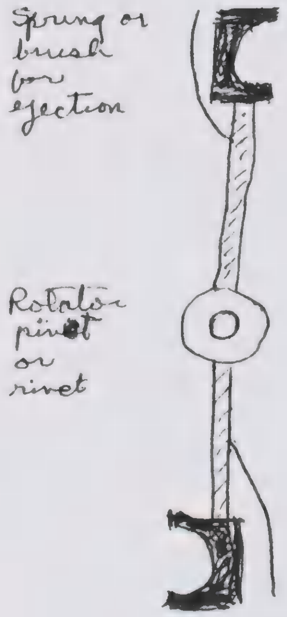
All comments are welcome

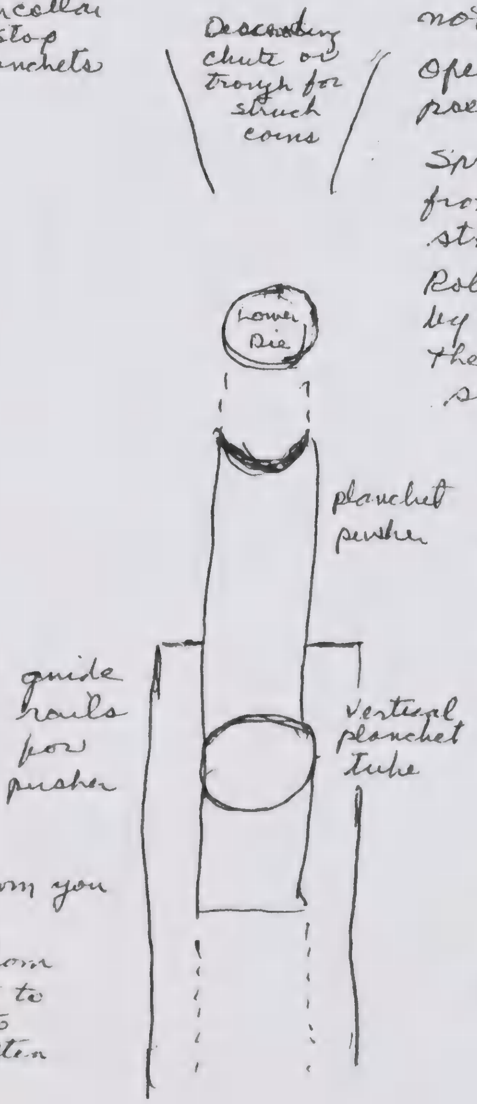
This is to be distributed to a few friends who are not to disclose its content without clearance except by comments to me.

EARLY US MINT POSSIBLE EJECTOR MECHANISM

Confidential ERIC P. NEWMAN March 2004

For many years I have been attempting to reinvent what mechanism was used for the planchet feeder and the ejector of struck coins at the U.S. Mint's 18th century and early 19th century operation. It was clearly an automatic rather than a hand operation and was specifically described in part as having an "open collar". What an open collar is has never been determined but what the change about 1827 was to a "close collar" is well understood. Screw presses were used in the beginning and were fed by the Boulton type feeding device using a vertical hopper or tube full of planchets horizontally and a reciprocating pusher below the tube to push the planchets onto the lower die one at a time as illustrated in Cooper, etc. The only mechanism I can vision complying with the "open collar" description is as follows:





No nippers were used or the open collar would not have been a proper description.

Open collar element is thicker than planchet to prevent pusher from sliding planchet too far or jump up.

Spring or brush sweeper knocks struck coin from lower die after screw begins to rise after striking

Rotator moves 90 degrees on each movement actuated by screw motion.

The open collar may be less than 180 degrees and slightly spread at its outer ends.

After the open collar sets the planchets in proper position it is rotated 90 degrees to avoid being near die during striking because planchet expands when struck and open collar must not interfere with descending upper die.

Pusher must be activated forward as soon as open collar is in position and pusher must withdraw before striking.

The guide rails for the pusher do not interfere with the rotator and the pusher is withdrawn when the rotator turns. The level of the bottom of the rotator is vertically the same as the face of the lower die and the top of the support for the pusher.

The actuators for the rotar and the pusher can be determined after the desired movements have been set.

All comments from you are welcome.

The few friends to whom this is sent are not to disclose the content to others without my written approval.

Subj: **Re: (no subject)**
Date: 04/05/2004 10:25:35 AM Central Daylight Time
From: EricNumis
To: jdrc@mindspring.com

Dear JD:
Are there any of my writings which you wish and may not have? Please let me know as I have written well over 100 things.

I have just completed a new drawing of what I think the first US Mint had as an open collar and ejector mechanism. If you would look at it and give me your thoughts I would appreciate it. I have been working on it for many years and revamped it several times. It has been submitted in the last weeks to three other "experts" on a confidential basis and since you mention "open collar" in your Grading book I think I should ask you to review my present thinking and mail it to you. Eric

JDRC
PO Box 1840
Cordova TN 3~~0~~8088 - 1840

Subj: **Re: (no subject)**
Date: 04/05/2004 10:33:02 AM Central Daylight Time
From: jdrc@mindspring.com
To: EricNumis@aol.com

Dear Eric,

Please send the drawing and I will give my opinion.

I have most of your writings, but when I come up to St. Louis next time, I will bring you some articles that I have written that have not been published or were published in obscure places. I will make a list of what I have of yours and you can "fill in the gaps".....

Best,

JD

> ----- Original Message -----
> **From:**
> **To:** jdrc@mindspring.com
> **Sent:** 4/5/2004 10:25:41 AM
> **Subject:** Re: (no subject)
>
> Dear JD:
> Are there any of my writings which you wish and may not have? Please let me know as I have written well over 100 things.
>
> I have just completed a new drawing of what I think the first US Mint had as an open collar and ejector mechanism. If you would look at it and give me your thoughts I would appreciate it. I have been working on it for many years and revamped it several times. It has been submitted in the last weeks to three other "experts" on a confidential basis and since you mention "open collar" in your Grading book I think I should ask you to review my present thinking and mail it to you. Eric

Subj: **Open Collar**
Date: 05/10/2004 12:25:21 PM Central Daylight Time
From: EricNumis
To: HVYMTL@PA.NET

Dear Craig:
I hope you are better healthwise and am looking forward to your comments on my prior submission to you of my open collar attempted reinvention. What do you think? Eric

Subj: **Re: Open Collar**
Date: 05/22/2004 10:05:29 AM Central Daylight Time
From: hvymtl@pa.net
To: EricNumis@aol.com

Eric,

Interesting proposal, but mechanically difficult. The opening in a screw press frame is only about 14 - 16". With a the dies and cups taking up about 4", that leaves only 4 - 6" total clearance from the inside of the frame to the side of the die cup. Figuring clearance from frame of at least 1/2", you are left with 3.5 - 5.5 inches for the mechanism and drive - wholly insufficient to create a solid, reliable mechanism as per your proposal.

The illustrations in Cooper and the Britannica clearly show that the French, British, and Germans all used the same type of mechanism. A review of "Early Engineering Reminiscences of George Escol Sellers" and other historical mechanical texts shows that American mechanical technology was the same as that in Europe. This is not surprising since all of the U.S. engineers at this time were either immigrants or sons of immigrants, and as part of the "merchant class" had regular contact with Europe.

Additionally, a mechanical analysis of the requirements leads to the conclusion that horizontal feed fingers with a vertically depressed collar or vertically raised lower die is the only sound approach to the task.

Considering the forgoing points, the Mint's feed mechanism was thus essentially the same as that in Europe. They MAY have used a "half collar" (though I doubt), but the mechanical requirements drive the design to one obvious mechanism.

Best, Craig

> ----- Original Message -----
> **From:** EricNumis@aol.com
> **To:** HVYMTL@PA.NET
> **Sent:** Monday, May 10, 2004 1:25 PM
> **Subject:** Open Collar
>
> Dear Craig:
> I hope you are better healthwise and am looking forward to your comments on my prior submission to you of my open collar attempted reinvention. What do you think? Eric

Subj: **Re: Open Collar**
Date: 05/29/2004 6:15:13 PM Central Daylight Time
From: EricNumis
To: hvymtl@pa.net

Dear Craig:

Thank you for your response to my feed and ejection mechanism suggestion. I appreciate your points and am giving further thought to them.

The size of the frame seems adequate to me as half of the rotating mechanism can be outside the frame and clear its supports when turning.

You did not comment on the ejection so I assume you feel that a spring on the front of the feed fingers was used.

I feel that a depressible collar is not possible when using die cups which we positively know they did. It has to be a half collar or less to be called an open collar.

I feel Sellers is not clear on the point. I feel that Eckfeldt might have invented something new as the open collar was not used in Europe. Perhaps the Connecticut Mint used an automatic feeder previously (1785 etc.) which was unlike the European type as Fugio coins also were mechanically fed and not hand fed.

I would appreciate your further comments on the above thoughts.

Numismatic mysteries are really fun. Eric

Subj: **Early US Coinage Feeding and Ejecting Mechanism**
Date: 06/05/2004 1:05:24 PM Central Daylight Time
From: EricNumis
To: HVYMTL@PA.NET

Dear Craig:
You have no idea how appreciative I am of your willingness to try to straighten out my thinking on the above. So few people would have gone into such detail as you did. Less than few would be able to outline all of the factors which go into your conclusions without getting intolerant.
I now realize that it is possible that the right arm of the nippers might have been referred to as the "open collar" because it is actually that. The left arm of the nippers is not a collar but with its 90 degree curve only helps the right arm in the forward movement and placement of the planchette over the die and then withdraws after the right arm of the nippers opens. I had not viewed this as justifying an open collar nomenclature.
My outline of my mechanism will work but its actuation is complicated as you pointed out and there was already a developed and tested mechanism which performed the same function. Some of the state mints including the Fugios apparently used the same type of nippers.
You have changed my thinking and I thank you.
Now what do you think?
Eric

Subj: **Re: Early US Coinage Feeding and Ejecting Mechanism**
Date: 06/06/2004 1:30:42 PM Central Daylight Time
From: hvymtl@pa.net
To: EricNumis@aol.com

Hi Eric:

I do not believe that the term "open collar" refers to the feedfingers. There is only one record mentioning both the "open" and "close" collars: a letter dated Nov. 8 1836, from Patterson to Woodbury, concerning the new Reeded Edge halfs. I'll just quote the relevant portion: "*The old coin was struck in what we term an open collar, this is struck in a close collar*…". The letter has also been quoted by Taxay on pg. 174 of *U.S. Mint and Coinage*, by Breen on pg. 390 of his encyclopedia of coins, and by Julian in a couple articles.

The interesting point of this quote is that it both sets the terminology and provides a comparison. To understand Patterson's statement we now have to do a little analysis work using what we know of the presses, coins, and mechnical terminology:

a. We know that collars served 3 purposes: help center the planchet reducing off-center strikes, make the coin round, and (if required) apply edge marking.
b. We know that the Mint changed from open to close reeded collars at different times on different denominations - 1828 on dimes, 1829 on half dimes and gold, and 1831 on quarters. Objective evidence of smooth flat edges on the cents which often show collar marks likewise show a shift to close smooth collars starting circa 1816. The collar on cents got progressively tighter thru the mid-1820s until it was a truly close collar.
c. We know BC Wailes saw the collar in action during his visit to the Mint although incorrectly ascribing the reeding to the feedfingers which he called "nippers".
d. From the foregoing, we know that the existing screw presses were modified to use a close collar as the historical record shows that Mint did not purchase new presses.

The Pattersons statement and preceding facts bring about the following questions:

1. If "open collar" meant no collar as some interpret, then why did Patterson not say that? Why say collar if a collar was not used?
2. Likewise, if "collar" does not mean collar but some other part of the press, as some interpret, then why did Patterson say collar?
3. What do "open" and "close" mean?
4. What kind of mechanism would account for the easy switch from "open" to "close" collars?

The answer to 1 and 2 is simple: Patterson said collar because he meant collar. Collars were in common use on coins by this time in both Europe and the US. Patterson was trying to communicate a technical issue to Woodbury, so he had to use common and correct terminology to avoid confusing the issue. There is therefore no attempted subterfuge, misuse, or mis-speak. Collar means collar.

The answer to 3 is a bit more complex and requires experience in mechanical terminology. It is made even more complex by the fact that technical idioms, as with common language idioms, can often be "regional". I had the good fortune to be trained in mechanical engineering in central PA - Reading, Philly, and the Harrisburg area. In this area the mechanical terms "open" and "close" mean the same as the common adjectival definition found in any dictionary. To quote Webster's:

- open, adj. - not shut up, disengaged, not enclosed; also v.t (verb transitive) - to loosen.
- close, adj. - shut in, enclosed, confined, near, tight.

Note that these definitions are antonyms - the exact opposite.

In the mechanical industries in which I worked (machining & die forming), "open" meant loose or away. As in "open the fit" or "open the tolerances", meaning make the fit looser or loosening the machining tolerances for easier assembly or production. "Close" meant tight as in "close fit" meaning a tight fit, or "close tolerance work" as in "tight tolerances, meaning very precise machining.

Based on this, Patterson's statement then becomes clear:

- A "close" collar is a collar that in very near the edge of the die and thus encloses the coin tightly during striking - exactly what knowledgeable numismatists mean today when they say close collar.
- An "open" collar is thus the exact opposite - a collar that is distant or away from the coin during striking.

Having established what open and close mean along with the fact that Patterson was being very clear and precise in his terminology, we now need to employ knowledge of the US Mint, the screw presses, and coinage to figure out what the open collar might have been.

1. We know why the Mint used an "open" collar - to prevent crushing of the edge design applied by the rimming machine (To digress, I do not use the term Castaing since Castaing was an engineer at the Paris mint who developed their rimming machine and thus refers to a specific design obviously not in use by the US Mint).

2. We know that the Mint was using feedfingers and that this mechanism was the same as that commonly in use throughout Europe.

3. We know that collars were also in commonly use and had a basic design and mechanism: the collar was either mounted on a spring and depressed or the lower die raised. The spring mount design was simpler and more commonly used.

4. We know that mechanical technology in the US and Europe was essentially the same - "common commercial practice" .

Conclusion:

Following this historical trail leads one to the conclusion that the open collar and its mechanism was basically the same as the close collar except that it was not left in the raised position during striking but depressed, thus avoiding the coin compressing against the collar during strike and crushing the edge impression.

The mechanism was thus designed such that the collar would rise briefly during the feed to help center the planchet just after the fingers had retracted (the same as the European close collar mechanisms shown in Cooper). The collar was then depressed again just before the dies closed. This part of the open collar mechanism would have been a very simple modification of the close collar mechanism. In fact, with the spring-mounted , all one would need to do is machine the upper die cup with a couple extended "tangs" [*noun, projection of a blade or tool*] that projected above the die. These tangs would contact the collar just prior to strike, depressing it during the strike. BINGO! - open collar.

The alternative design of a collar cammed to rise and depress as required similar to Boulton's design found in the Britannica is equally possible. I tend to the "tang" method only because of its simplicity.

The beauty of this overall conclusion (either mechanism) is both its compliance the historical record and its simplicity:

- It meets all the requirements.
- It is entirely consistent with the historical record including the historically documented mechanical designs of the screw presses.
- It does not require redesign of the historically documented and commonly used screw press mechanisms.
- It presents no mechanical challenges.
- It requires no convoluted or obtuse linguistic interpretation of Patterson's statement - open means open, close means close, and collar means collar.
- It thus meets the test of Occam's Razor.

Best, Craig

> ----- Original Message -----
> **From:** EricNumis@aol.com
> **To:** HVYMTL@PA.NET
> **Sent:** Saturday, June 05, 2004 2:05 PM
> **Subject:** Early US Coinage Feeding and Ejecting Mechanism
>
> Dear Craig:
> You have no idea how appreciative I am of your willingness to try to straighten out my thinking on the above. So few people would have gone into such detail as you did. Less than few would be able to outline all of the factors which go into your conclusions without getting intolerant.
> I now realize that it is possible that the right arm of the nippers might have been referred to as the "open collar" because it is actually that. The left arm of the nippers is not a collar but with its 90 degree curve only helps the right arm in the forward movement and placement of the planchette over the die and then withdraws after the right arm of the nippers opens. I had not viewed this as justifying an open collar nomenclature.
> My outline of my mechanism will work but its actuation is complicated as you pointed out and there was already a developed and tested mechanism which performed the same function. Some of the state mints including the Fugios apparently used the same type of nippers.
> You have changed my thinking and I thank you.
> Now what do you think?

Subj: **Re: Early US Coinage Feeding and Ejecting Mechanism**
Date: 06/08/2004 7:17:26 PM Central Daylight Time
From: hvymtl@pa.net
To: EricNumis@aol.com

Eric:

Die cups (also called die stakes, die holders, or die fixtures) are fixtures used to attach the dies to the press. In screw presses they also assist in grossly centering the die in the press. Shims in and under the die cups were used to exactly center and parallel the dies. From the mid 19th cen. on, advances in design, mechanics and precision machining resulted in the development of fixtures that both fixed and adjusted the dies.

Die cups can take many forms. The Britannica shows the die cups used in the Boulton presses. The upper cup is a rather complicated machining, but essentially a solid base with a hollow cylindrical upright with bolts to fix the die. The lower die cup is probably more like what the Mint's die cups would have looked like - a flat round or square plate with a hollow cylindrical upright with bolt to fix the die.

The die cups are bolted to the bed and upper ram of the press. The dies are then placed in the cups and fixed with bolts that pass thru the cup and engage machined "detents" (depressions) in the dies.

The US Mint dies in the ANS give hint as to the design. The cent and other small diameter dies were fixed in the cup with one bolt; the half dollar and larger dies with 2. The ANS dies clearly show the detents (depressions) where the bolt passing thru the cup engaged and thus fixed the die in the cup. See my speech from the 1996 ANS COAC.

The cups would have come up maybe half of the die height. The inner diameter of a die cup would have been somewhat larger than the die. Probably a good bit in the early days to allow for die bulging during striking, say an 1/8th inch or so - a little sloppy and difficult to adjust for centering, but if the die bulged you could still get it out of the cup.

My best guess is that the bottom cup was fixed and depressible collars used as with the Boulton design. This is a much simpler design. The drawings in Cooper do show that the French used fixtures allowing the lower die to be raised, at least for the virole brise.

Best, Craig

----- Original Message -----

> **From:** EricNumis@aol.com
> **To:** hvymtl@pa.net
> **Sent:** Monday, June 07, 2004 1:33 PM
> **Subject:** Re: Early US Coinage Feeding and Ejecting Mechanism
>
> Dear Craig:
> Let me have some further time to think about your suggestion as to creating a site. Perhaps Peter Gaspar should be in the group although much of his work has been on English minting techniques and with Graham Dwyer retired from the Royal Mint. Dennis Cooper has died.
> There are other questions I want to ask you. I just do not understand why cups were so necessary. Were the cups used in the early US Mint at the same level as the face of the die? Did the cup at the bottom move? Did the inside diameter of the

exposed cup touch the die face? How did the bottom cup help in the placement of the planchette? I was under the impression that a cup strengthened the die stem so that the die would not crack or break as easily as if there was no cup. Did the top or bottom cup perform any other function? Did the cups have an indentation in their sides to lock them in place with screws or did the cups fit over the outside diameter of the die stem?
Please clarify me on these matters. Thanks   Eric

[redacted]

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Money Museum

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St. Louis, Mo. 63101
314-421-1819

May 1999

It is possible that at some period during the early U.S. Mint coinage that a nippers was not used on some denomination~~al~~s ~~coinage~~ to grasp and slide the lowest planchet in the hopper stack forward onto the lower die. ¶ An alternate procedure could have provided a ~~A~~ collar plate surrounding much of the lower die neck. that collar plate could have had an elevated ~~might have been used having~~ a ~~higher position in~~ semi-circular portion surrounding ~~shape around~~ the back of the die which ~~was higher~~ would act as a stop and positioner when a planchet was pushed forward by a sliding bar with ~~the sliding bar would withdraw~~ a concave semi-circular front end. Before the striking took place This sliding bar would be withdrawn and all of the collar plate would be depressed below the level of the top of the lower die by the downward movement of the screw press. After the striking as the upper die rises the collar plate would return by spring action so that only the semi-circular elevated ~~higher~~ portion in the rear would rise above the level of the lower die face. The expansion of the planchet during the striking would have incresed the diameter of the coin sufficiently to create enough contact surface to have ~~lift~~ the coin lifted from the lower die by ~~the~~ ~~[illegible]~~ elevated portion of the colla. The struck coin would then be ejected by the next forward movement of the finger, spring or brush attached to the forepart of the slider.

This mechanism would avoid scratching or marring a struck coin when ~~[illegible]~~ is ejected ~~by ejecting it~~ while resting on the lower die. It would also justify the use of the term "open collar". It would be used in striking of coins which did not require the edge being shaped ~~shaping~~ with a retaining collar (whether described as a close collar or a collar die). There is no other way I can ~~understand~~ outline ~~[illegible]~~ ~~[illegible]~~ as to how the term open collar could have been used because the internal shape of the nippers could not logically be construed to be an open collar.

Eric P. Newman

Mercantile
Money Museum
Mercantile Tower
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St. Louis, Mo. 63101
314-421-1819

A ~~[illegible]~~ ~~the~~ problem which seems to need ~~needing~~ solution is ~~is to~~ what was the open collar used by the U.S. Mint before adoption of steam coinage or before exclusive close collar ~~[illegible]~~ coinage.

The nippers which clasped the planchet and moved it onto ~~a p~~ the top of the lower die had two arms. each containing ~~on their inside~~ inward sides circular cut outs on their inward sides. One cut out was semi circular in area and the ~~other a~~ ~~[illegible]~~ quarter of a ~~concave~~ circle ~~between the [illegible] & [illegible]~~ ~~These could not logically be called an open collar.~~ ~~as~~ ~~the~~ They do not ~~look~~ appear ~~collar~~ like a collar. They function as a grasping tool ~~they~~ on a pivot, unrelated to opening and closing, a function ~~[illegible]~~ ~~[illegible]~~ ~~related to any~~ ~~to a collar function~~. They ~~[illegible]~~ it seems they could not ~~not logically~~ be called a collar.

The only open collar ~~function I have~~ ~~seen which comes to mind is a~~ a part which can be designated as an open collar is the partial collar around the neck of the lower die. Such a partial collar could have been used to lift the struck coin off the lower die so that when it was pushed off the lower die ~~the~~ [illegible] abrasion and marring would not occur.

3f a full collar

~~[illegible]~~ The collar would be a circular cut
of a flat metal plate, the circular cut out would
be the size of the lower die neck with ~~sufficient~~ to
close clearance so that it could be constrained and
lowered on the neck. the collar plate ~~It would~~ would have
a short ~~[illegible]~~ upward actuation ~~[illegible]~~ by spring or springs and
be depressed by the downward movement of the ~~the~~ top flat plate
screw press. When the striking occurred ~~it~~ would
be below the level of the top of the lower die face
and ~~[illegible]~~ the die plate would rise as the upper
die holder would rise. the collar ~~It would~~ plate would have
~~[illegible]~~ stops to restrict its rise.

Such a die plate would lift the struck coin
of the lower die because the diameter of the
struck coin would be increased 3%-5% by the
compression of striking and expand onto the
perimeter of the lower die face. The struck coin
would be loosely supported by the ~~die~~ collar.

The pushing of the struck coin forward
by ~~the use of the nipper to~~ attached to forepart of the
a spring or lever ~~[illegible]~~ ~~the~~ the ejecting
nipper would eject the coin. ~~[illegible]~~
springs lever might hit the collar ~~[illegible]~~
as well as the coin, making the ejection
~~[illegible]~~ requires perfect movement. However
if the collar ~~is~~ were cut away in the
portion closest to the nipper ~~[illegible]~~
~~be a~~ the spring or lever would hit only the
edge of the struck coin and ensure the ejection ~~[illegible]~~
~~more~~ simpler ~~because~~ because the lower ~~portion~~ would
be elevated by the back portion of the die plate

elevated portion of
~~raised~~ hole the

If the collar plate were only a semi circle with back of the cam plate the straight cam ~~the cam~~ would tilt down toward the upper when it was elevated instead of being lifted in horizontal [illegible] position as it would be if ~~totally~~ elevated by a ~~total~~ 360 degree. ~~This~~ It thus appears that a 280 ~~to 300~~ degree ~~cut~~ collar necessary is adequate to raise the same cam horizontally and leave enough ~~space~~ clearance so that the ~~rotating~~ spacing of the opening in [illegible] would not be affected.

~~This cam~~ This partial edge around the upper part of the die neck would serve a dependable purpose and would appear to be the shape of the open collar.

It must be understood that this proposed mechanical description is entirely theoretical and without any early ~~[illegible]~~ descriptive support. Yet it is simple enough to be easily applied. It complies with the use of the term open collar and gives a reason for the neck of the dies to be the same diameter as the die face.

1

Little seems to be known about the equipment ~~method~~ ~~[illegible]~~ used ~~machinery~~ in the first U.S Mint ~~[illegible]~~ ~~[illegible]~~ for ~~the~~ the planchet feeding and coin ejecting mechanisms for the screw presses. the ~~first~~ earliest comment seems to be a report dated February 9, 1795 from the Elias ~~Bd.~~ Boudinot committee to the House of Representatives as to the equipment on hand, a portion of which stating "three coin presses, with the improvement of supplying and discharging themselves by machinery". this is reconfirmed by Elias Boudinot in a letter dated April 22, 1799 to Matthew Boulton in England ~~Soho, in England~~ ~~which~~ advising "We use Common Presses with Levers that go by manual labor excepting that as to small coins and Cents, the Press is fed by means of a Hopper instead of being put under by hand." When observations made about 1812 by young George Escol Sellers at the U.S. Mint were described by him much later in life he said ~~at~~ ~~He put a~~ described his experience with Adam Eckfeldt as follows: "He put a blank planchet into my hand, showed me how to drop it in, and where to place my hand to catch it as it came out; * * * she asked if it was not cold when he gave it to me to drop into the press." Benjamin L. C. Wailes, a Natchez, Mississippi cotton planter on a sight-seeing vacation to the east coast with his wife visited the first U.S Mint on the morning of December 28. 1829 and entered into his pocket notebook that a ~~pincers~~ nippers "admits the introduction of the coin before & its ejection after it receives the impression".

these comments prove conclusively that the planchets were not placed on the lower die by hand and ~~could not~~ that ~~if~~ the struck coin was not removed from the lower die by hand during the ~~first~~ routine U.S Mint operations of the first U.S Mint screw presses.

~~The next~~ Another feature of the minting process closely ~~connected~~ related to feeding and ejection is the use of a collar. On November 8, 1836 at the time of the first striking of coinage by a steam press instead of a screw press Robert Patterson the director, states, in a letter to Secretary of the Treasury Woodbury as to coinage of silver: "the old coin was struck in what we term an open collar, this is struck in a close collar which makes the edge of the pieces thicker and gives mathematical equality to their diameter." In a September 22, 1836 letter from Patterson to Adam Eckfeldt as to dollar coinage struck in the large screw press it is stated that "the pieces being struck in close reeded or ground collar." The word "ground collar" obviously indicate a smooth collar interior.

~~The~~ A most powerful hint as to the nature of the feeding and ejecting mechanism comes from the structure of the few remaining known die of the period. These dies are dated – – –
They have a cylindrical neck exactly the same diameter as the ~~face of the~~ die face for a short distance toward the stem of the die. The stem of the die is held the die in place in the die block by screws and the neck is not affected. This neck must have had a raison d'etre. ~~Ordinarily there~~ On normal dies there would be an widening bevel from the die face into the die stem as this would lengthen the life of the die and be better protection to against perimeter die breaks chips or cracks which appear as a "cuds" on the struck coin. Therefore there must be a good reason why dies would be deliberately weakened. The only apparent reason that this would be done is to permit a circular collar or partial collar to move up and down on the die neck. This collar might be on the lower die or the upper die or both. If a collar or partial collar were only to be on the lower die then ~~the one would~~ the upper die ~~could~~ might avoid having such a neck, but in that case the dies would not be interchangeable in position. If the upper die had a collar or partial collar that collar might have perform a separate function from the collar on the lower die.

~~A partial collar~~
The function of a collar or partial collar on ~~the upper die~~ surrounding the neck of the upper could be used to push off any struck coin which stuck to the upper die ~~after striking after the~~ when the upper die was rising. On the downstroke of the upper die it could ~~pass~~ slide by a ~~rigidly mounted~~ a horizontal rigidly mounted collar. ~~On the~~ the diameter of the struck coin would have ~~expanded to broaden in diameter~~ increased beyond the perimeter of the die face and if the struck coin stuck to the upper die the collar would ~~push~~ flick it off and it would ~~fall back~~ drop into the path of an ejector mechanism

Patterson ~~in~~ a letter dated November 8, 1836 wrote to Secretary L Woodbury concerning the striking of the new Gobrecht designed 1836 silver dollars in a steam press and ~~[illegible]~~ commented as to their improved quality by saying:

"the old coin was struck in what we term an open collar, this is struck in a close collar, which makes the edge of the pieces thicker, and gives a mathematical quality to their diameters."

~~It is impor~~ In the effort to learn what was meant by open collar it can be noted that the expression uses the words "struck in" for both the open and closed collar. ~~Therefore~~ ~~the conclusion that the planchet is within the open collar or the close collar~~. Knowing that it must be within the close collar ~~when struck~~ ~~to~~ or collar die when struck is obvious, but since the open collar ~~does~~ may not ~~[illegible]~~ ~~during striking~~ restrict ~~the edge~~ ~~the expansion~~ ~~to form~~ the planchet ~~it clearly~~ it must ~~it to~~ surround it to some ~~[illegible]~~ extent to warrant the description of "struck in". If it did not retract from ~~[illegible]~~ the planchet during striking it would leave a mark or impression on the struck coin. It therefore could retract before or during striking so as not to leave any mark. If it were open during striking ~~[illegible]~~ surrounding the struck coin it could be spring or pivoted ~~[illegible]~~ tongs, nippers or fingers with semi circular or partially circular cut outs facing each other. The tongs would ~~have~~ ~~to be thinner than the planchet so that~~ ~~the dies would not but then clear them~~ be clear ~~the dies would be thinner than the planchet~~ of the dies ~~and~~ during striking and probably ~~necessary to~~ slightly thinner than the planchet being struck.

Benjamin L. C. Wailes (1797-1862), a cotton planter living near Natchez, Mississippi visted Baltimore, Philadelphia and Washington, D.C. with his wife on a sight-seeing tour in 1829, making notations of his experiences and observations in a leather bound pocket note book. In his hasty notes his spelling, grammar and technical accuracy leaves something to be desired, but his observations at the U.S. Mint on the morning of December 28, 1829 are of great importance. His notes were never rewritten or revised. He was aware that a new U.S. Mint building was under construction in Philadelphia and described the original 1792 U.S. Mint facilities as a "very mean house".

What his notes positively show is that attached to the screw presses still in use for coining was an automatic planchet feeding mechanism and an ~~automatic~~ ~~struck~~ automatic struck coin ejector mechanism. ~~He~~ The only manual labor for coining he observed was the turning of the main lever for the screw presses and the filling of the planchet tube. There was no hand placement of planchets on the lower die and no hand removal of the struck coin. He observed the rolling of the strip from bars and the punching of planchets ~~from~~ out of the ~~strip~~ rolled strip. He ~~did not see~~ apparently did not see ~~the~~ any Castaing machine for ~~putting~~ edge lettering or milling and this caused him to ~~make an~~ draw an erroneous conclusion ~~from~~ as to edge treatment.

Benjamin L. C. Wailes (1797-1862), a cotton planter living near Natchez, Mississippi, visited Baltimore, Philadelphia and Washington, D.C. with his wife on a sight-seeing trip in 1829 ~~and on December 28, 1829~~ making notations ~~of what he~~ of his experiences and observations in a leather bound pocket notebook. ~~His~~ In his hasty notes ~~of his visit to the first U.S. Mint in Philadelphia on December 28, 1829~~ his ~~[illegible] extremely important [illegible]~~ spelling, punctuation and grammar and accuracy were hasty ~~and unsophisticated~~ left something to be desired, but the matters he observed at the U.S. Mint in Philadelphia on December 29, 1829 were of great importance. ~~The second U.S. Mint was under construction. He observed that He mentioned that the second~~ a new ~~U.S. Mint was under construction.~~ His notes were never rewritten or revised. He was aware that a new U.S. Mint was under construction. ~~and~~ but referred ~~to the described~~ to the existing ~~[illegible]~~ U.S. Mint buildings as a very "mean house".

He describes the planchet cutter as driven by a "powerful which requires a quarter of a revolution to bring it down & to clip out the the size of the coin". ~~The~~ He states that the coining machinery ~~he describes~~ "consists (like the cutting machinery) of a very powerful upright screw; to the top of which is affixed a very heavy & strong lever worked with apparent ease by one man at each end, & by which the Screw is made to make about one fourth of a revolution & returning instantly to its former position." He then states that the coin on the lower die is surrounded by "a pair of nippers (which gives the milling or impression on the edges) & which by placing as a pivot in the matter of of sheers admits the introduction of the coin before & its ejection after it receives the impression."

He then describes the planchet tube as a hopper which holds many blanks in ~~a~~ vertical stack" at the bottom of which is an appartus sufficiently large to admit the passage of the coin, one at a time. the lower end in the file (or hopper) is struck out with great accuracy by a thin piece of iron made to strike edgewise at each movement of the lever, ~~It~~ and is conveyed by a channel formed for the purpose & is conveyed directly on ~~and~~ & under the dye". ~~The screw is brought The~~

First I would like to try to clarify ~~what~~ some of the details which Wailes wrote.
the transcription of the word ~~[illegible]~~ "rivit" should be
"pivot" ~~[illegible]~~ in my opinion. the illegible word is
"scissel" in my view. ~~Now we come to the~~ ~~obvious~~
~~confusion in the notations first we~~ Wailes seems
to be the first ~~to use~~ one to describe the equipment by
using ~~the important~~ ~~[illegible]~~ words "nippers", "tube", "hopper", "file"
"channel" and "spout", all of which clearly understandable
~~and~~ as parts of the feeding and ejecting ~~process~~ equipment. Certain
comments about the process seem erroneous. ~~but~~ He states
That ~~[illegible]~~ the nippers ~~as which~~ "give the milling or impression
of the edges" and this is impossible. The lettering or milling
design on the edges is produced by the Castaing machine ~~before~~ Except for 1793-4 copper & the
~~the blanks~~ on silver and gold planchets before striking.
edges of copper planchets were milled in a ~~[illegible]~~ whether made at or ~~whenever~~
outside ~~the machine~~ the mint with circular rolling machine ~~whether~~ ~~made~~
~~made~~. It must be concluded that the nippers were
holding the planchet when ~~[illegible]~~ the planchet was ~~[illegible]~~
moved ~~[illegible]~~ onto the top of the lower die as that is the primary functions
of the nippers.

He also states that the planchet is conveyed by ~~[illegible]~~
a channel formed for the purpose". ~~[illegible]~~ The planchet
could not be conveyed in a channel but conveyed by a
channel by some ~~part~~ other ~~part~~ element (the nippers).
Wailes also describes removal of the bottom planchet
from the hopper "by a thin piece of iron made to strike
edgewise at each movement of the ~~[illegible]~~ "lever" ~~this~~ the
hopper has to ~~have to~~ ~~[illegible]~~ and then be ~~in a hopper~~ ~~of the coins are in a hopper~~
~~[illegible]~~ a gravity drop ~~[illegible]~~ the thin piece of iron ~~made~~
~~[illegible]~~ moved within a channel. ~~each movement of the lever cannot~~
~~to strike edgewise at each~~ ~~and therefore can only apply to~~
~~apply to the hopper and~~ must be a spring to ~~[illegible]~~ move
~~the ejector~~ the bottom planchet into the channel to be picked
up by the forward motion of the nippers.

Rewrite

The full quotation of his notations as to U S Mint machinery follows, because Don Taxay ~~only quoted a portion of it~~ did not quote its entire text as presented in Pennsylvania Magazine of History and Biography. Taxay did appreciate its significance as describing the planchet feeding and coin ejection.

The comment ~~conclusion~~ that a nipper or tongs puts ~~the~~ edge milling or [illegible] other ~~text or~~ decoration or text on the edge is ~~incorrect~~ wrong [illegible] but is an understandable error. This thought ~~comment~~ [illegible] is further confused ~~reported~~ when he says "the screw is brought ~~After~~ down & the nippers close with a force that makes the ~~[illegible]~~ impression. ~~the blows~~

~~He again~~ After the striking he ~~stated~~ that the nippers open

Ejection of the struck coin is described as "the Stamped Coin is struck out of its place & conveyed into a Box by a Spout (or conductor) as the Screw rises"

The importance of these observations is that ~~there was a feeding mechanism~~ ~~for~~ the screw press used for coining had both a planchet feeding mechanism and a struck coin ejecting mechanism. This was before the Introduction

CLOSE or CLOSED Collar

To elemenate any question as to whether the use of "close collar" was intended to refer to "closed collar" in U.S coining practices a letter dated Sept. 22, 1836, from Robert Patterson, U.S Mint Director, to Adam Eckfeldt, US Mint Chief Coiner, clearly indicates the meaning of the words. the letter stated as to coining dollars in the large screw-press "the pieces being struck in close reeded or ground collar." the word "ground" indecates a smooth collar. Today the word "a" would be added in front of the word "close."

It is well known that the internal diameter of a collar die is slightly larger than the diameter of the face of a die being used in conjunction with it. this is done to permit the planchet to expand laterally when being struck and to be formed on its edge when forced by the two horizontal dies against the inside of the collar. the ~~depends on the distance~~ difference in diameter between the face dies and the collar die in the improving of coining practices from 1828 on in America seems from later experiments to be about 3%. therefore the word "close" occurately indecates a small destance between the circumference of the die faces and the inside of the collar die. It also would have been redundant and of no further help to describe a round collar as "closed". the opposite of "close" is "distant. the opposite of "closed is "open". thus the word "close" as so used describes a destance, not a shape.

The Early U.S Mint planchet feeder and Struck Coin Ejector

~~with~~ there are no known drawings and no known description of ~~the problem of~~ how planchets ~~were fed~~ were ~~put~~ placed on the lower die and ejected after striking in the screw presses at the first U.S Mint ~~is intriguing~~. An examination of the U.S coins ~~early coppers, the silver coinages and the~~ of these earlier years ~~does not leave a clue or the errors~~ their double strikes, brockages and other errors does not seem to clarify the matter. As a result it is sometimes assumed that the planchets were placed on the lower die by hand and the struck coin removed by hand.

The problem therefore is to reinvent what the ~~[illegible]~~ expert mechanics at the U.S Mint actually designed ~~and~~, built and used, knowing ~~they had neither steam power or waterpower available for~~ ~~and~~ that the screw presses were ~~powered~~ operated by ~~human~~ manpower and neither steam power or water power were available for ~~that~~ the striking function.

~~We do know an "open collar" was in use~~ ~~that the British feeding striking practices developed by 1788~~ under ~~the~~ Matthew Boulton Mint in ~~Practices~~ Soho, England were known.

Boulton's feeding and ejection practices developed by 1788 ~~by~~ under Matthew Boulton ~~were known~~ at Soho, England ~~and~~ other methods used by European mints were known. were known. ~~the fact that~~ the expression "open collar" ~~was used in~~ United States was ~~was used referred to~~ applied to U.S Mint operations ~~was unexplained by the people who used it~~ by early officials without explanation.; The fact that there was a planchet feeding mechanism, and ejecting mechanism was ~~[illegible]~~ clear from the comments of George Escol Sellers, an American mechanical engineer, as to what he experienced in 1812 at the US Mint.

This is a plea for suggestions. I have worked on this problem for over a decade and have tried to extrapolate from the few known facts to the design presented. I welcome thoughts and comments from others to help reconstruct what ~~probably~~ existed. It is an exciting numismatic challenges to unfold what may have been a secret.

When young George Escol Sellers in 1812 was invited into the coining room by Adam Eckfeldt and was privileged to coin a ~~cent~~ a U.S. copper one cent piece Sellers stated: " text.

It is clearly expressed twice that the planchet was dropped in the mechanism and not placed by hand on the lower die. It is also clearly expressed twice that he caught the struck cent as it came from the mechanism and not lifted by hand off the die. Therefore there had to be a planchet feeder element and a struck coin ejector element. The resort to the attendant workers by placement on the die with human fingers and removal of the struck coin by human fingers ~~was not~~ had been eliminated. Removal of the struck coin the attendant using a brush or hand instrument was also eliminated because the coin was automatically projected and caught.

~~Another~~ The expression open collar is used in the following writings:

Walter Breen in the Glossary ① describes the open collar as follows:

Any oval opening in a one piece plate of this nature would hold the coin too loosely to place it accurately over the lower die. If the opening was large enough ~~to clear~~ not to squeeze or mar ~~confine~~ the

Rob Retz, ~~[illegible]~~ in working on the Fugio dies of 1787
has noticed ~~certain~~ ~~the [illegible]~~ ~~all known examples of several~~
~~are [illegible]~~ there is an identical offcenter position
of each known example of ~~—— separate~~ variety
N. ~~[illegible]~~ in a —— position,

of each known example of variety of N

and of each known example of variety of N.

This would indicate that a feeder mechanism was used in their striking because no placement of the planchet by hand on the lower die would result in this type of uniformity. ~~[illegible]~~ Only the position of a ~~feeder slide~~ ~~[illegible] feeder tongs or pusher~~ ~~sliding pusher or feeder~~ ~~whether pusher slide~~ or ~~pusher tongs slide~~ sliding tongs ~~or~~ feeder could cause this result.

516
2605

~~milled, lettered, or~~

smooth, lettered, decorated or reeded edge then it would be ~~so loose around the planchet that the planchet would not be accurately placed on the lower die by such a.~~

When a planchet is struck the diameter of the struck coin is about 3 to 5% greater than the diameter of the planchet, depending on the striking pressure and the original thickness of the planchet. Thus the opening in Breen's holder would have to be large enough not to contact the finished edge of the struck coin and would thus be so large that planchet it transported ~~would be~~ would ~~the~~ too loose be inaccurately placed over the lower die because it would be loosely controlled. ~~In addition there~~ the ejection ~~removal~~ of the struck coin ~~would be difficult~~ from the lower die would often mar it because it would be pushed sidewise out of the lower die. ~~There is no way~~ the words open collar would not be applicable to this plate ~~instrument~~ because it is completely closed. ~~There~~ Thus definition ~~[illegible]~~ cannot be ~~to~~ interpreted as a tongs which would open and ~~[illegible]~~ close so as to hold ~~out~~ to release and/or ~~and~~ to rehold ~~the~~ the piece being handled.

Explanatory Notes for planchet feeder (a safe one)

A = vertical stack of planchets over slider. Stack will permit only one planchet to fall in slider recess when slider is retracted.

B = Slider which has about 180° curved front to push planchet over lower die.

C = Housing or track for slider so slider can be pushed and pulled

D = Lower die

E = A brass, wood or leather planchet stopper (thinner or thicker than the planchet) to prevent the planchet from being pushed beyond the die.

F = Stop to hold planchet stopper in proper position when planchet is pushed forward

G = Spring to make planchet stopper return to position

H = Bearing to hold bar

J = Arm to actuate planchet stopper movement

K = Pin to hold bar joints together

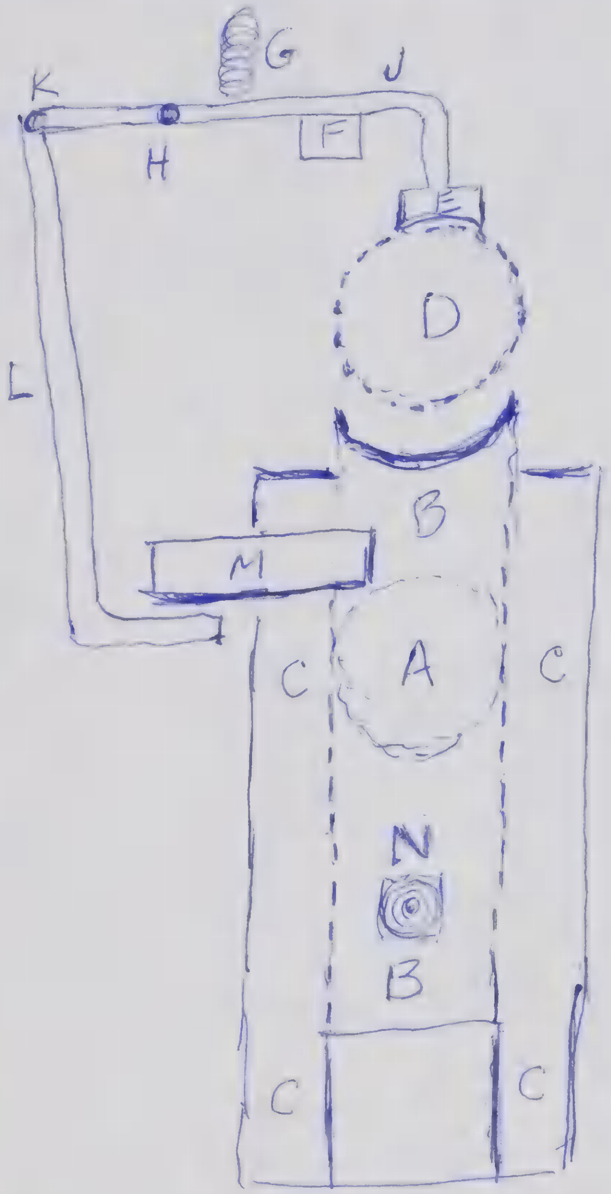
L = Bar to be moved by slider movement.

M = Projection from slider to move bar when slider moves

N. = Handle on slider for pushing and pulling.

Nov 1997
Eric P Newman

Suggestion as to how an 18th century hand operated feeder might be designed and used without injury.



A brush or spring could be easily added to remove the struck coin.*

See explanatory notes.

* the struck coin could be removed by a foot operated treadle, by an attachment on the feeder or by a separate hand operated gadget.

On a theorized mechanical ejector mechanism
~~[illegible]~~ late 18th and
of ~~[illegible]~~ the early 19th century screw press using cylindrical
die necks The removal of a struck coin which might stick in the upper
die ~~is~~ could be much simpler to accomplish ~~[illegible]~~ than the
removal of a struck coin from the lower die. ~~[illegible]~~
While no ~~drawing or~~ design or mechanism is known

All that is necessary to dislodge a struck coin from the upper die ~~with~~ a cylindrical neck is a fixed horizontal thin finger ~~which almost~~ one ~~touches the~~ inch more or less above the level of the lower die. It ~~[illegible]~~ would extend ~~to~~ and almost touch the upper die faced neck. When the upper die descends for ~~[illegible]~~ striking the ~~[illegible]~~ it does not touch the extended finger. ~~If a stu~~ On the rise of the upper die of the struck coin sticks ~~to~~ the upper die on the rise of the upper die the ~~planch~~ struck coin is larger in diameter ~~than the~~ ~~[illegible]~~ due to expansion in striking and will ~~[illegible]~~ ~~hit~~ contact the underside of the extended finger and flick-off the upper die

Jon M. Warshawsky

Res 619 618 1747

Bus 619 610 1731

Mark Borckardt

Bowers + Merena

"How Early Cents were made"

Craig Sholley Eastern Pa

Kneass article

"Source of the presses used at the Mint"

6/3/97 Borckardt will send articles

by Sholley and Kneass.

Frank H. Stewart

History of the First United States Mint (1924)
reprinted 1974

Expenditures of Mint of the United States Paid Out of Annual Appropriations after March 4, 1793

April 3, 1795 Adam Eckfeldt, for blacksmith work done in January and March consisting principally of punches, poppets, sliders, turning three screws 4½ inches in diameter. Forging a slider, 45½ lbs; a large lever, 778 lbs 66£ 16s 1d; a large press and sundry work, 18£ 16s 10d; an arch door, 30¼ lbs, two die stakes 65 lbs; steeling punches, etc. Total bill 181£ 4s 11d

the arch door weight is obviously an error – it is a price. It could be £30 1 4 or £30 14 –

the two die stakes are a price not a weight. It could be £65.

the total bill justifies this.

Bob Julian says the records which Stewart use were then at the Mint and are now missing. Summaries are available but no detail like these warrants.

~~66 16 1~~
1~~8 16 10~~
~~85 12 11~~

Taxay

p. 96 Coining press

Feb 1795 "with the improvement of supplying and discharging themselves by machinery"

footnote
struck in open collar

p 97 At the Philadelphia Mint, planchets were fed by ~~hand~~ a hopper and after striking, automatically ejected.

This is under a picture of the screw press in An "Essay of Coining"

p. 98 older brother was Charles who was born in 1806.
Moved ~~to~~ over Market St. store in 1817.

Tatay p.166

close collar

p 169
"layer on"

p.174

Prony Riche (1755-1839)

.59 ~~folder~~ pages 4 leaves of plates

1803 Paris

Baudouin published

at Univ of Chicago

Northern Ill Univ.

Univ of Delaware —

Harvard Business School

Univ of Wisc Madison —

Bob Julian 11/1/98

3/1/96 Boudinot wrote Wm Coltman
Gov. & Company of Copper Miners
Sheet copper
or planchets enclosed

same for ~~Boulton~~ Boudinot
wrote Samuel Bayard Amer Claims Commissioner
~~Boulton~~.

Aug 1833 Samuel Moore letter to
Matthew R Boulton ordering more.
stronger milling for ½ cents
which would prove smaller diameter

Amer State Papers ~~Feb 1795~~ Feb 9. 1795
milling machine(s) produces 10,000 pieces per day

Craig Shalley "always had raised border" —

Early 1795 Harper could better job than mint could
improvement.
~~Feb 1796 letter from Boudinot to House of Rep:~~

Franklin Institute
1820 - 2017 Eckfeldt

Inter

~~Franklin and the Chain Design by EPN (Numismatist, Nov 1983)~~

~~15 [illegible] in Chain~~

Breen Half Cent
p. 25

citation for 1799 automatic feeder
Copies of Correspondence of the US Mint
Phila 1795-1834 Vol 1 p. 267

~~Jon Dati 1750~~

A simple feeder is described in Machines Approuvées par L'acadamie, 1731 Vol. 5, p 155

Source
1818 Hubbard
encyclopaedia

Craig Scholler
1618 Walnut Botton Rd
Carlyle, PA 17013
717 243-7443

E Craig5@pa.net

Work 717 303 0399 Ext 28

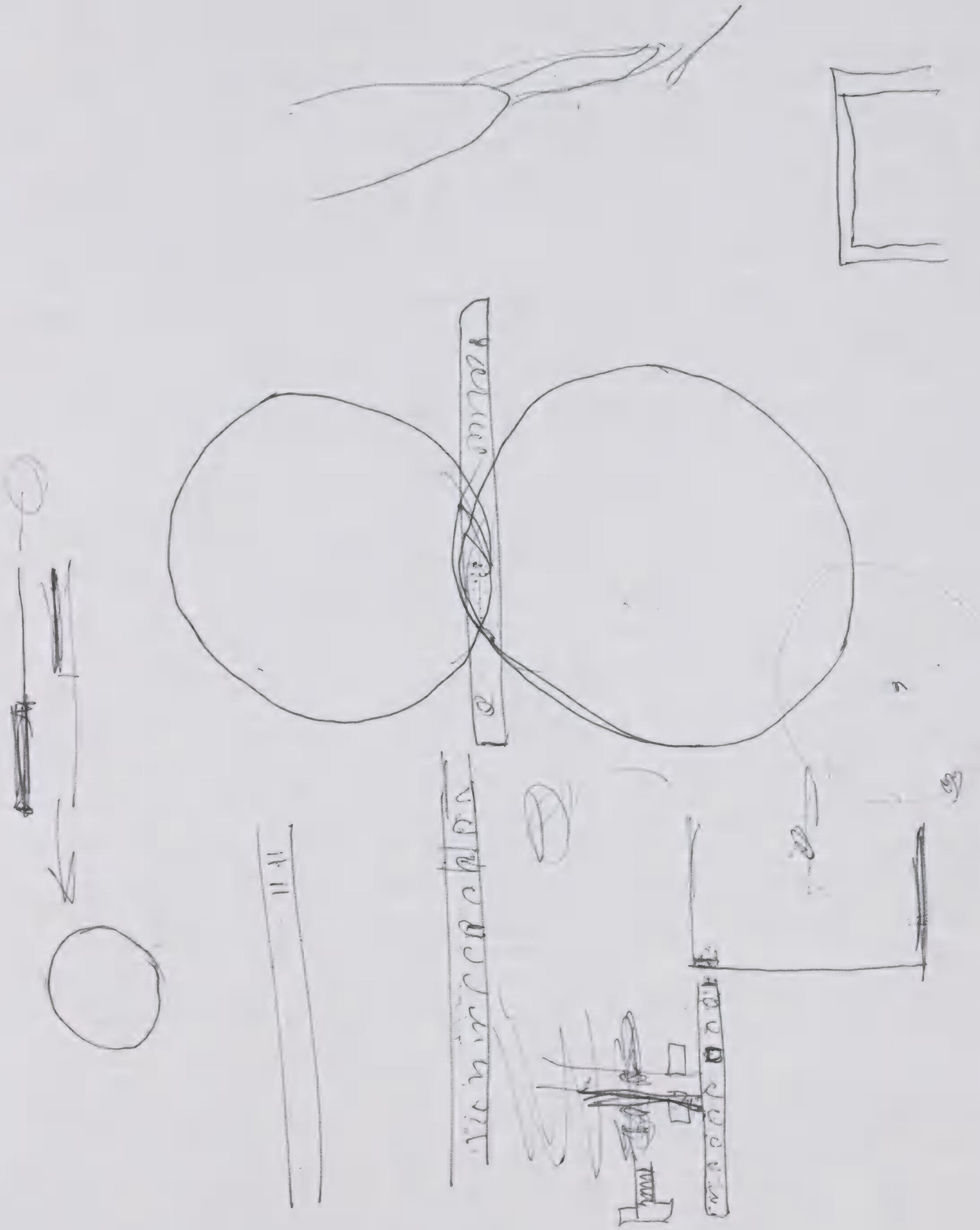
Diameter of strawberry leaf

EVENT [illegible]
9100 EPN
2600 EEN
39

9

7100
600
7700
8000

H



about "close collar"
Ken Cable's ~~the~~ article entitled "Close Encounters"
by Ken Cable requests early ~~written~~ references on the
subject

Hot under the Collar

Ken Cable's "Close Encounters" article in the
requests early references on the subject and here
they are

~~there~~ thus it ~~is~~ seams clear that it has no
relationship to the reeding on the collar.

there is no indication in the article as to what
the "open collar".

the origin of the expression "the ~~collar die~~ die is cast" relates to thrown
dice, not a collar die or a plaster cast.

Eric P. Newman has asked at several EAC
meetings if anyone knows the details of ~~about~~ the open collar
and ~~this is still no respon~~ Cable's
comparison to a open shut collar does not help
"tie" ~~the matter~~ up the matter.

The inclusion of the question mark following the title
of Cable's comments is quite significant

American State Papers - Financial. Vol. I, pp. 352-355

No. 21

Feb. 9, 1795. Report of the Committee headed by Elias Boudinot to House of Representatives on the state of the Mint. 3rd Congress, 2nd session.

Excerpts are as follows:

The works consist of two rolling machines, one for hot and the other for cold metal, worked by four horses, and require five hands, constantly to attend them, while in operation. There is a third, nearly completed, to be appropriated to the smaller coinage. A drawing machine for the purpose of equalizing the strips for cutting the planchettes, and are worked by the same hands as are last mentioned. Three cutting presses for the planchettes of larger and smaller coins, which are worked by one man each. A milling machine, which is intended to be worked by the horse mill, but, at present, requires one hand. Three coin presses, with the improvement of supplying and discharging themselves by machinery. Six hands will attend three, if in one room.... A fourth, for dollars and medals, in particular, will be furnished in about three months. Two turning lathes for dies, and a boring machine for making holes in the large frames, screws for presses, stakes, rollers, and an infinite variety of instruments and tools, necessary to carry on the coinage.

+ + + + + + + +

No work of this kind, requiring equal force and equal precision, ever having been made in this country, workmen, those expected to be obtained from Europe, by some means having failed in the different branches, were hard to get, and many, when engaged, were not masters of their business; the materials were difficult to be obtained and often proved insufficient for the force required - even bar iron, from the large size required, as well as castings, caused great delay before they could be had; often times, when the machinery was finished and set to work, it gave way, and all was to be done over again. All the tools, necessary to make the machines, were first to be made themselves. Not only the whole machinery in all its parts, but all the tools necessary for their formation have been executed at the mint. This could not be effected by an union of all the proper artizans, each a complete workman in his own department, but from necessity, was confined to the principal officer of the coining department, who could only proceed from theoretical principles, with the assistance of such workmen as could be procured, to whom most of the machines, however common in Europe, were entirely new. Add to this, that mere theoretical knowledge has produced greater complexity in the system and of course, greater delay and expense than full practical knowledge would have found necessary.

The mints in Europe have been gradual in their improvements and have been of many years standing. This has had every difficulty to struggle with, and was to be brought to perfection at once, lest our coins should not bare a comparison with those of other nations. Those lately executed are superior to any made in Europe.

* * * * * * * * * *

It would be a very important saving to the public, as well as add great expedition to every part of the machinery, if they could be put in motion by water, or steam, instead of manual labor, or that of horses.

* * * * * * * * * * * * * * *

It has also appeared to your committee that the price of copper is very fluctuating, and may so increase, as in some degree, it has done since the law for ascertaining the weight of cents, that , when coined and issued, coppersmiths may work them up in considerable advantage.

* * * * * * * * * * * * * * *

The rolling machine for the large coin, will roll from twelve to fifteen thousand ounces per day; that for small coin, about half the quantity. The drawing machine, for strips, can execute, daily the produce of one rolling machine. The three cutting presses will each cut from fifteen to eighteen thousand planchettes per day, and the milling machine will also pass them through at the same time, when worked by horses; but, in the present state, will mill about ten thousand. The three coining presses, when complete will strike from eight to twelve thousand of the smaller kind of coin per day, so that, on an average, ten thousand cents, equal to one hundred dollars, may be coined in a day by each press, if all are worked.

pr. the Packet
Via N. York

Capt. Le

Sir

I had the Honor of writing you of the Dates of July 10th, Octr. 3d & January 16th last; but have not been favoured with a Line in Answer.— I am at a Loss to know the reason of your Silence, as we are totally out of Planchetts, and of Course many of our Hands must be idle unless we can receive an immediate Supply.— The Copper Company in England had offered to supply us constantly; but I preferred the Planchetts recd. from you, as they fully answered my purpose.— I therefore wished an explicit answer from you, whether I might depend upon a punctual Supply from you three or four times a Year, amounting to 30, 40 or 50 Tons pr. Ann.— I sent you in my Letter of 3 Oct, a Bill of Exchange for £400 Sterl: drawn by Handl. Dr. Aguila of the Island of Jamaica on Messrs Alves Rebello & Co. Merchants in London, but am not advised of the receipt of it, tho' of so long a date— I now enclose you the first Bills of three Setts of Exchange drawn by David Stewart & Sons of Baltimore, on Brickwood & Daniel Merchants in London dated Feby 18th 1799 payable to David Steward and endorsed to you by Benj. Rush Treasurer of the Mint for the Sum of £1150 Sterl. payable in 90 Days which I beg you will carry to the Credit of the Mint, in Hopes that Planchetts at least to this amount are on the way.

I must beg to hear from you pr. first opportunity and am Sir

Your obedt. Hble. Servt.

Boudinot
to
Bolton
4/22/1799

FROM the COPIES
OF CORRESPONDANCE
LEDGER

STARTS HERE

Duplicate
pr. Ship Douglass
Matthew Boulton

Philada. April 22d 1799

Sir

The foregoing is a Duplicate of my last

Triplicate
pr Ship Delaware
Capt. Clay

to you with the Difference of covering the second Sett of Exchange therein mentioned. Since which, as late as Friday I was honored with your favour of the 24th Decr. which gave me great Satisfaction as I could not acct. for your long silence.- I am much pleased with your acct. of the Improvements you are making in the Art of coining + especially in preventing Counterfeiters meeting with Success, as they are the Vermin of Society - If you should be of Opinion that anything you chose to communicate under the strongest obligation of Secrecy would be of public Service, you may depend on my Integrity on this head - I should esteem it a very particular mark of your Confidence + Benevolence if you would give me any Instructions relative to the Principles of the Machinery used in coining.- For all this we are on the small scale, yet to us as a young People, it is a matter of great Consequence as our Specie bears a proper Proportion to our Numbers - We use the common Presses with Levers that go by manual Labour, excepting that as to small Coin + Cents, the Press is fed by means of a Hopper, instead of being put under by Hand.- We strike about half a Million of Dollars in Gold + Silver pr. Ann. and as many Planchetts of Copper as we can get.- It would have been very pleasing to me to have had our Coin struck by abler Artists, if Policy + the national Prejudices permitted it, but this was found impracticable.—

The greatest Difficulty I have experienced is in the Dies.- Much of this proceeds from want of good Steel.- If you send me a Ton of the best kind, it would greatly oblige me, indeed.— Your friendly + generous Communication relative to the hardening of Dies, demands my

(most)

most cordial thanks— We have practiced hitherto on the same Principles, excepting the oil or Tallow in the last part of the Business, which in my opinion, will be a great Improvement— I am much obliged by your Resolution to ship me ten Tons of Planchetts, the Bills now sent will fully reimburse you, and I will be careful to keep you in Cash for all you may send hereafter — I beg you will not let any opportunity slip to keep us well supplied, as I have been sometime wholley idle as to the Coinage of Copper: and as to the Price, if we get the Copper as cheap as other People, it is all we can expect. —

MINT RAN OUT OF COPPOR ON APRIL 7 OR SO.

Mat^w

p. ther

We are making some Endeavours to obtain Copper in this Country, particularly at Schuyler's Mines, in New Jersey— there is nothing in the Way but Water — I hope when our North Western Country is opened a little more, that we shall be able to supply your market with ore, as there is an immense Body of it on the upper part of Lake Erie —

Dupl. p

Trip pr.

I would be much obliged to you for an Estimate of the Expence of a steam Engine equal to twelve Horses continually at work — I should be glad to know what sort of Crucibles you find the best, and to have a Sample of a few Dozen of a good sort.

I have had it in Contemplation to request you to let me have an Estimate of the Expence of a Mint compleat in all its parts, but on a small scale, to be executed by you & sent out here with full Directions for putting it up, including the Engine &c. &c.- If you could favour me with such an Estimate, accompanyme to induce Congress to agree to it, I should be much obliged, as it might render the Busi=ness more expeditious & easy in future — I am led to this request by the hint you have given me of your making one for the Emperor of Russia.

I am &c.
(signed) Elias Boudinot

Matw. Boulton — Mint of the U. States July 3d 1799

Sir

p. the Adriana — Your favour per the Amelia with 60 Casks of Planchetts came safely to hand, weighing $\overset{C}{199}$ „ $\overset{qr.}{2}$ „ $\overset{lb}{21}$, Dupl. p. Packet — which with the Expences &c, &c, amounts to £1610„7„5 Sterl. These Planchetts come very high, but we must submit Tripl. pr. Brig Abigal — to existing Circumstances, and all I can ask, is to have them at the lowest market price. The enclosed Certificate of the Brig having sailed with an armed Vessel, will enable you to recover 2 pr. Ct. on £1600. (the sum ensured) which will reduce your Demand for Copper to £1578„7„5 — I refer you to my Letter of the 20th of March enclosing Bills for £1150. which with £400 before paid makes 1550£. leaving a Ballance due to you of £28„7„5 —

Enclosed you have the first of two Setts of Bills of Exchange — One drawn by David Stewart & Sons on Messrs. Brickwoods & Daniell for £1100 — the other drawn by John Glasford on the Lord's Com=missioners of His Majesty's Treasury for £500, making in the whole £1600 Sterl. payable at 60 Days sight. By the first Sail Vessel will repeat my remit=

Extract of a letter from Mint Director Samuel Moore to
Matthew Robinson Boulton of Soho, near Birmingham.
August 20, 1833
[Letter Book of 1824–1835]

...

I have now to request that you will furnish the Mint with another supply of ten tons of cent planchetts and five tons of half cent planchetts. For the latter coin the demand has been slow. We have yet on hand a part of the coins of that denomination from the supply furnished by your house under my request of 6 Dec'r 1824. You will be able, it is hoped, to accomplish the present quantity of cent and half cent planchetts so as to be delivered before the winter closes in upon us. Your early attention will therefore be a special accommodation in this instance, the cent planchetts being preferred, however, as the first object if one will retard the other.

Please to notice the milling of the half cent planchetts last furnished in regard to which I have to observe that Mr. Eckfeldt, the Chief Coiner, wishes the milling of the next to be a little stronger. This will of course contract the diameter proportionally, which will be satisfactory.

...